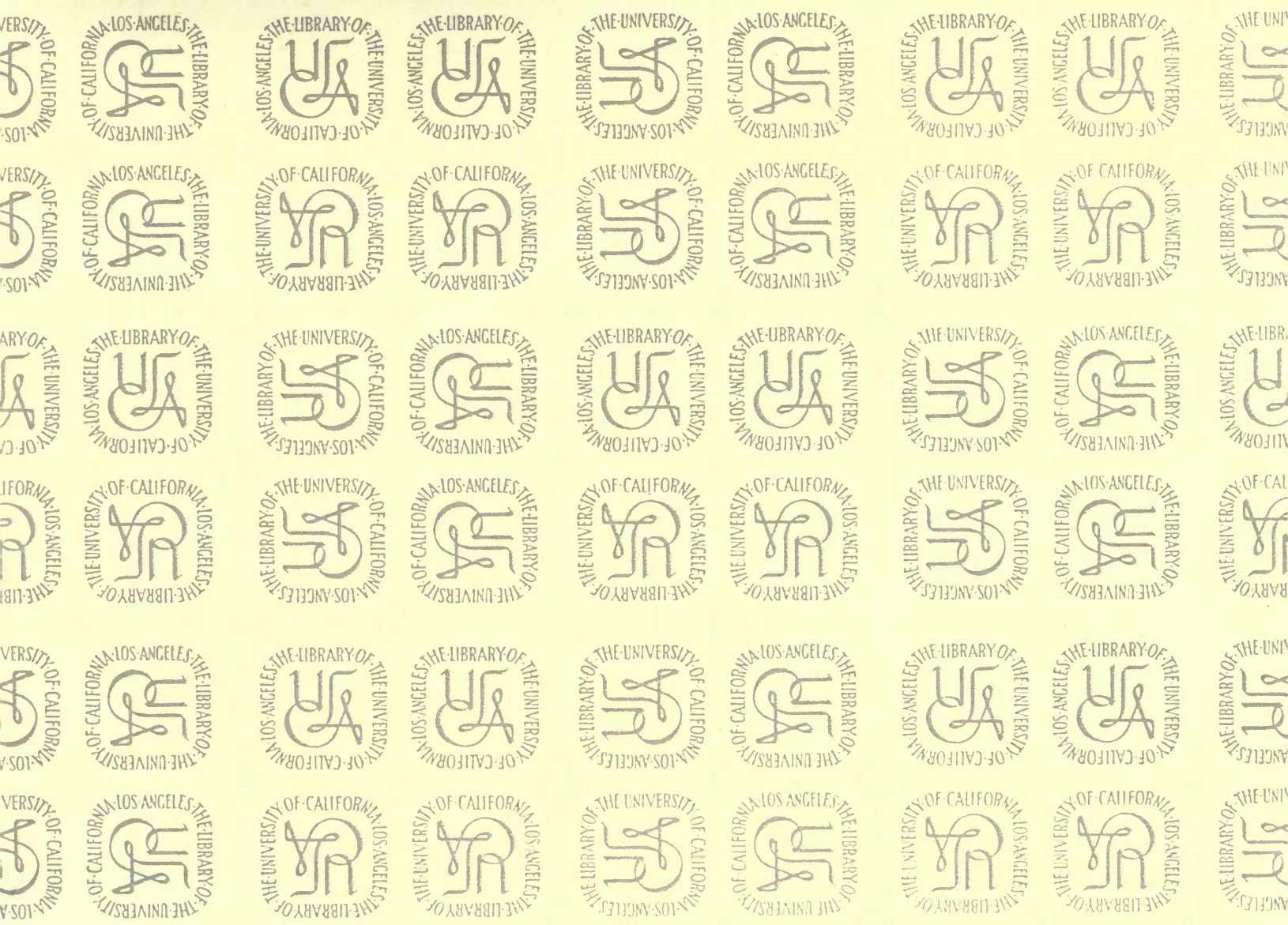
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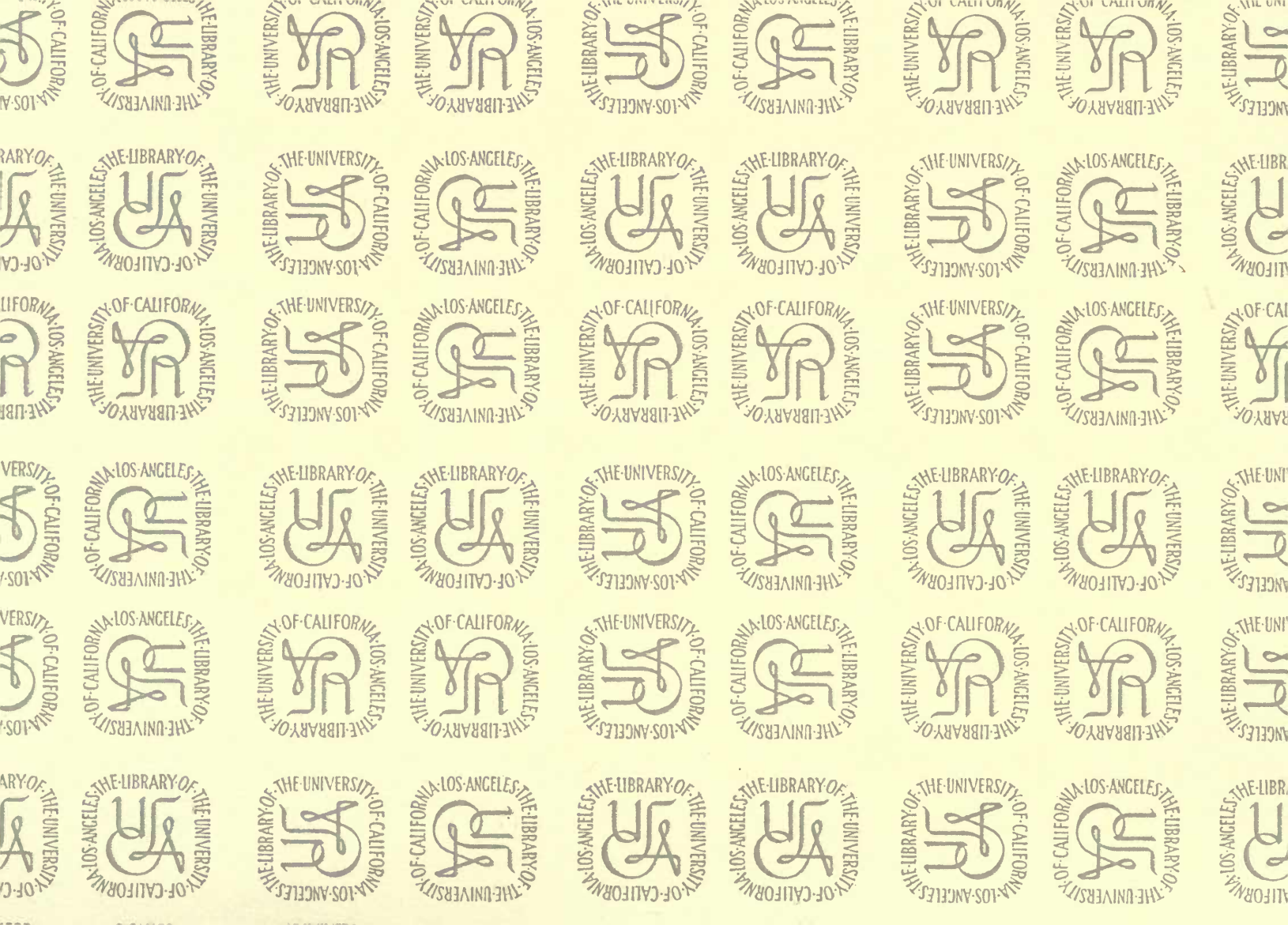
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THE CENTRAL STATE.

SOUTH AUSTRALIA:

Its History, Progress And Resources.

BY

DAVID J. GORDON.

Adelaide:
VARDON AND PRITCHARD, PRINTERS, GRESHAM STREET.
1903.

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HON. J. G. JENKINS,
Premier and
Chief Secretary.

HON. R. BUTLER,
Treasurer and
Commissioner of
Crown Lands.

SIR G. R. LE HUNTE,
K.C.M.G.,
Governor of
South Australia.

HON. L. VON DOUSSA,
Attorney-General and
Minister of Education.

HON. R. W. FOSTER,
Commissioner of Public Works and
Minister of Industry.

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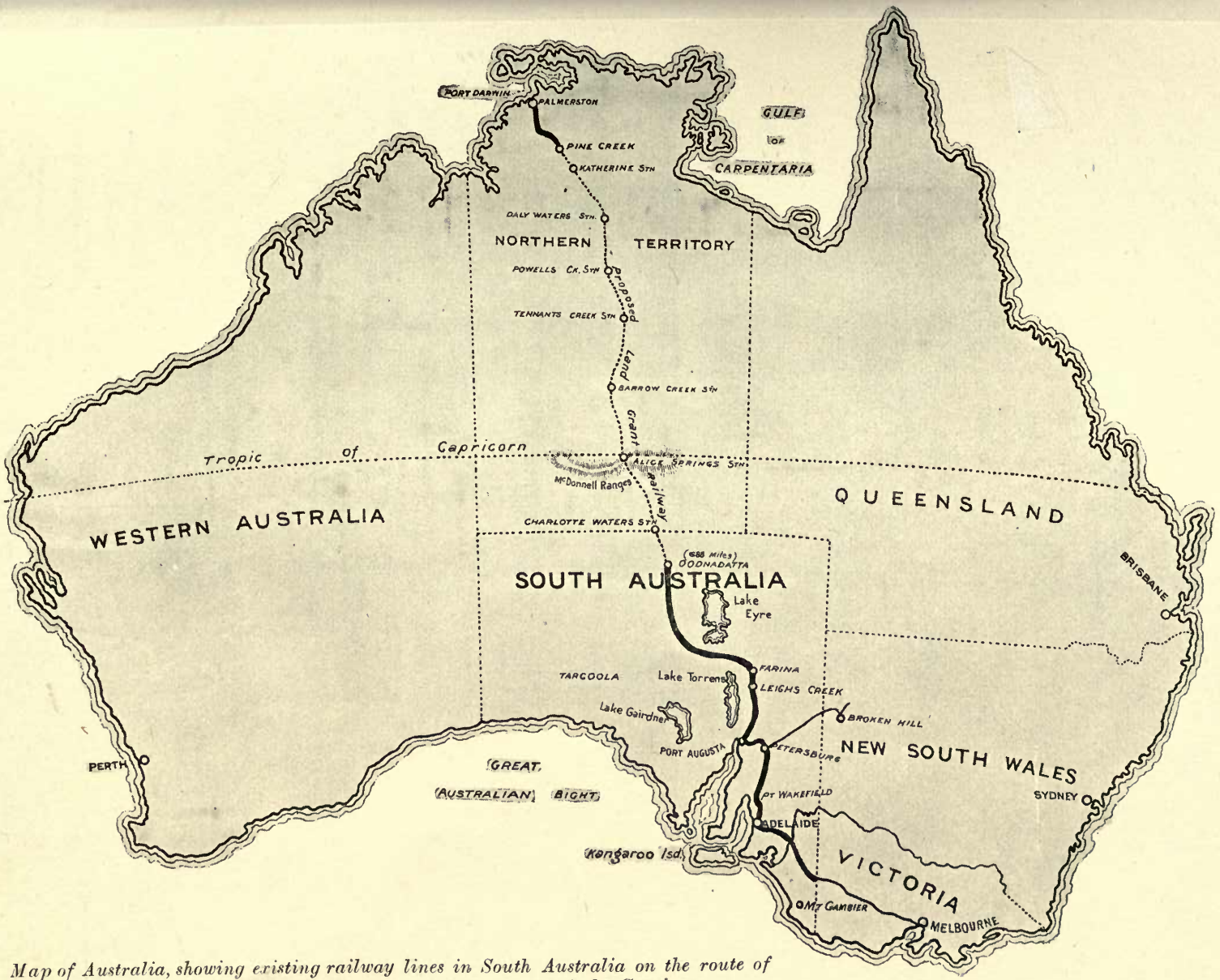

Map of Australia, showing existing railway lines in South Australia on the route of the proposed Land Grant Railway through the heart of the Continent.

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The Commonwealth of Australia

HISTORY fails to supply a parallel to the peaceful occupation of the Australian Continent. Not one British soldier or sailor has been called upon to sacrifice his life in order to secure or to hold Australia for the Empire. The "Flag of England" has never been challenged from the day in April, 1770, when Captain Cook sailed the "Endeavor" into Botany Bay, or since Captain Matthew Flinders cruised along the Southern Coast from the Leuwin, and cleared decks in order, if necessary, to prevent any display of the tricolour on land by the French explorer Baudin, whom he met in Encounter Bay. Warships of every nation have visited our shores at frequent intervals, but their emblems of nationality have been dipped to the Union Jack flying above the harbours.

The bloodless conquest of the "Great South Land" was followed by the trial of various systems of colonization. That employed in the founding of South Australia was unique because of its ideal principles and the new theory of political economy which they represented. The colonization and expansion of the Australian group represent the most glorious triumphs of the Nineteenth century. A continent had to be explored, rivers bridged, forests cleared, and a never-ending war waged against unknown natural conditions. Fire, flood, and famine confronted the early settler as he sought to make a home in the bush. These and other foes continued to cross the path of the pioneer as he pushed his way into the heart of Australia, undismayed by the failure of others, confident in his own strength, unconquerable in patience and determination.

Progress in other directions has been no less substantial and significant. In no other country is there to be found greater political freedom or social equality; better facilities for education in all its branches—more certainty that each "shall reap where he has sown"—than in that Commonwealth representing the union of once divided States. At the beginning of the Nineteenth century Australia was practically unknown. A handful of white people were located on the Eastern shore within sound of the Pacific Ocean. To-day there are few blanks in the map. There is a population of nearly four millions. The flow of trade outwards and inwards in 1902 represented a total annual value of £138,231,000; production in 1901 represented a sterling value of £112,704,000. The public revenue for 1902 aggregated £28,000,000. Excluding unsold lands and public works the value of private property in Australasia in 1813 was £1,000,000; twenty-five years later it was £26,000,000; in the next quarter of a century it rose to £181,000,000; in 1888 it amounted to £1,015,000,000; and in 1901 the total was £1,083,838,000. "Although Australasia," says Mr. Coghlan, the leading statistician in the Commonwealth, "has but the population of a province of some of the great European powers, in the wealth and earnings of its people it stands before most of the secondary states, and as regards wealth and income per head of population it compares very favourably with any country." The value of land in private hands

in the Commonwealth is £350,281,000, or 38.54 per cent. of the value of all property in Australasia. In this total South Australia is credited with £34,080,000, or a proportion of 41.73 of all property held privately in the State. The value of land and improvements together in the Commonwealth amounts to £627,805,000, or 69.08 per cent. of all property. This State's contribution to this result is £56,060,000, or 68.65 per cent. "The improvements on the lands of the Commonwealth and New Zealand are," says Coghlan, "valued at £327,163,000, which sum represents 79.46 per cent. of the value of the land, ranging between 84.45 per cent. in New South Wales, and 59.16 in Tasmania." The nature and worth of private property held in Australia are as follows:—Land, £350,281,000; houses and permanent improvements, £277,524,000; live stock, £85,048,000; furniture, &c., £29,746,000; personal effects, £12,066,000; machinery (excluding mining), £29,852,000; shipping, £5,874,000; mining properties and plant, £32,299,000; merchandise and produce on hand, £59,711,000; coin and bullion, £26,361,000; total, £908,762,000. The subjoined table gives a bird's eye-view of the substantial progress made, and serves to indicate the high level of prosperity at present enjoyed in the Commonwealth of Australasia:

States of the Commonwealth of Australia.	When Established.	Area in Acres.	Population December 31, 1902.	Value of Production, 1901.	Production per head.	Imports, 1902.	Exports, 1902.	Total Trade per head of Population.	Private Wealth per head.	Miles of Railway open, 1902.
				£	£ s. d.	£	£	£ s. d.	£ s. d.	
SOUTH AUSTRALIA ..	**1836**	**578 361 600**	**365,791**	**10 314 000**	**28 8 2**	**6,073,782**	**7 698,514**	**37 13 0**	**227 0 0**	**1 881**
New South Wales ..	1788	198,848,000	1,405,450	38,954,000	28 7 9	25,974,210	23,544,051	35 4 7	265 0 0	3,025
Victoria	1836	56,245,760	1,205,513	28,926,000	24 0 11	18,258,211	18,198,958	30 4 10	234 0 0	3,302
Queensland	1825	427,838,080	514,851	16,933,000	33 11 5	7,355,552	9,171,059	32 2 3	230 0 0	2,801
Western Australia	1825	624,588,800	215,140	12,544,000	66 17 11	7,218,352	9,051,358	75 3 2	230 0 0	1,360
Tasmania	1802	16,778,000	177,072	5,033,000	28 19 10	2,442,745	3,244,508	37 15 3	208 0 0	457
The Commonwealth of Australia ..	1901	1,902,660,240	3,883,817	112,704,000	29 12 11	67,322,852	70,908,448	35 6 7	243 0 0	12,828

Under the federation which became operative on January 1, 1901, the States do not lose their individuality. Each is permitted to work out its political and industrial destiny within the terms of a liberal Constitution.

Discovery of South Australia.

FLINDERS, by forestalling his rival—Baudin—in 1802; Sturt, in following the Murray river to its mouth in 1830, were the real founders of South Australia. These great Englishmen explored as well as discovered. They were keen observers, possessed of cool deliberate judgment. When circumstances compelled deductions to be made from uncertain premises there came to their aid a natural instinct suggestive of prophetic vision. Especially is this true of Captain Sturt. His estimate of the potential value of the rivers Murray, Darling, and Murrumbidgee has been more than justified. How accurately he described the country crossed by him in his greatest interior journey, stockowners who subsequently lived in those parts discovered to their cost when the drought period returned. Flinders, Sturt, and subsequently Captain Barker, removed many false impressions concerning the character of the southern portion of the continent. In 1627 Dutch navigators sighted the southern coast of New Holland. Beyond christening it Nuytsland they took no notice of what they regarded as a rough, inhospitable, barren country. The story of the memorable cruise of the "Investigator," 340 tons, in which Captain Flinders surveyed the coast from the Leuwin via Encounter Bay to Cape Northumberland, cannot be repeated in detail in these pages. Matthew Flinders was the first to set foot on the shores of Southern Australia, and to his painstaking inspection was chiefly due the settlement which followed. The great navigator was a believer in "efficiency," and all his work was marked by thoroughness and accuracy. He discovered, named, and charted capes, bays, gulfs, and islands, often landing to make a careful examination of the soil, and to take observations from hilltops. Tablets have been erected on Kangaroo Island, Mount Lofty, and the Bluff, at Encounter Bay, to perpetuate his memory as one of England's most daring sailors and explorers.

Captain Sturt, the first man to discover that the country had many natural advantages, voyaged down the Murray in a small rowing boat with convicts as companions. He accomplished in this trip one of the greatest triumphs in the annals of Australian exploration. He ran the gauntlet of hostile natives, endured terrible hardships, and, keenly disappointed at finding that the noble stream ended at a point which encounters the full force of the Southern Ocean, turned about and rowed up stream to his starting place. It was a wonderful achievement—one of the most daring and successful accomplished during a long and chequered career.

A year later Captain Collet Barker, of the 39th regiment, when on his way from King George's Sound to Sydney, entered St. Vincent's Gulf and landed on its eastern shore twelve miles north of Cape Jervis. With six members of the ship's company Captain Barker crossed the Mount Lofty ranges, discovered the mount which bears his name, and proceeded along the shores of Lake Alexandrina to the Murray Mouth. For the purpose of making observations from the top of a sandhill he successfully performed the dangerous feat of swimming across the river where it joins the ocean. This gallant officer and daring explorer was killed by the natives, who threw his body into the sea. Captain Barker's name stands first in a long list of explorers who have laid down their lives in the bush of Australia in the service of humanity. The general opinion in New South Wales as well as in England was the same as that expressed by the early Dutch voyagers: that the southern portions of the continent consisted of inhospitable country, not fit for habitation by white people. In 1822 a naval captain read a paper before a society in New South Wales in which he stated:—"The south coast of Australia is barren,

Forest Scene, Mount Lofty Ranges.
W. Gill photo.

and in every respect useless and unfavorable for colonization." The following is probably the earliest expressed opinion of South Australian soil. It was written by Matthew Flinders in 1802:—"The soil of that part of Kangaroo Island examined by us was judged to be much superior to any before seen, either upon the south coast of the continent or upon the islands near it; with the exception of King George's Sound. The depth of the soil was not particularly ascertained; but from the thickness of the wood it cannot be very shallow. Some sand is mixed with the vegetable earth, but not in any great proportion, and I thought the soil superior to some of the land cultivated at Port Jackson, and to much of that in our stony counties in England."

In his account of his memorable journey down the Murray in 1830 Captain Sturt wrote:—"We were borne over the ruffled and agitated surface of Lake Alexandrina with such rapidity that I had scarcely time to view it as we passed, but cursory as my glance was, I could not but think I was leaving behind me the fullest reward of our toil, in a country that would ultimately render our discoveries valuable, and benefit the colony for whose interests we are engaged. Hurried, I would repeat, as my view of it was, my eye never fell on a country of more promising aspect, or of more favorable position, than that which occupies the space between the lake and the ranges of St. Vincent's Gulf, and, continuing northerly from Mount Barker, stretches away without any visible boundary. It appeared to me that, unless Nature had deviated from her usual laws, this tract of country could not but be fertile, situated as it was to receive the mountain deposits on the one hand, and those of the lake upon the other." A member of Captain Barker's party wrote:—"The soil was rich, there was abundance of the finest pasturage, no lack of fresh water, and it was a spot in whose valleys the exile might hope to build for himself and for his family a peaceful and prosperous retreat."

Captain Sturt (after his great inland journey) wrote:—"Taking South Australia in its length and breadth, the quantity of available land is, beyond doubt, very limited, but I regard it as exceedingly good, and believe that its capabilities have by no means been ascertained. I feel satisfied, indeed, that necessity will prove not only that the present pastoral districts are capable of maintaining a much greater number of stock upon them than they have hitherto borne, but that the province is also capable of bearing a very great amount of population; that it is peculiarly fitted for a rural peasantry, and that its agricultural products will be

sufficient to support masses of the population employed either in its mining or manufactures. In this view of the subject it would appear that Providence has adapted the land to meet its new destinies, and that nothing we can say, either in praise or censure of its natural capabilities, will have the effect of concealing either the one or the other as time shall glide on. . . . The climate of South Australia is admirably adapted for the growth of fruit trees of the hardier tropical kinds. The vine, the fig, the pomegranate, and others flourish beyond description, as do English fruit trees of every kind. Such trees as are congenial to the climate arrive at maturity with incredible rapidity, and bear in the greatest abundance. There are in South Australia two periods of the year which are equally deceptive to the stranger. The one is when the country is burnt up and suffering under the effects of summer heat—when the earth is almost herbless, and the ground swarms with grasshoppers—when a dry heat prevails in a calm still air. The other, when vegetation is springing up under the early rains and everything is green. Arriving at Adelaide during the first period the stranger would hardly believe that the country, at any other season of the year, would be so clothed with herbage and look so fresh; arriving at the other, he would equally doubt the possibility of the vegetable kingdom being laid so completely prostrate, or that the country could assume so withered and parched an appearance; but these changes are common to every country under a similar latitude, and it would be unjust to set them down to its prejudice or advantage. . . . Both in climate and other respects it is a country peculiarly adapted to the pursuits and habits of my countrymen. It is a country to which an Englishman may migrate with the most cheerful anticipations."

The General Post Office, Adelaide.
A. Vaughan, Survey Dept., photo.

Launching a New Province.

THESE revised opinions concerning the capabilities of Southern Australia reached England during a period of political upheaval and social unrest. The effect of the great financial panic, which started in 1825, was still felt. The French Revolution threatened to spread across the channel. When this danger had passed, the long and bitter struggle in connection with the Reform Bill began. Riots were frequent, and the hero of Waterloo was bombarded in his own house by a London mob. So gloomy was the outlook for political and religious liberty that many cast longing eyes towards distant outposts of the Empire, and the spirit which induced the Pilgrim Fathers to go West in the "Mayflower" was at work once more. This leavening influence spread rapidly, and caused a ready response to an attractive proposal of colonization in southern latitudes then announced for the first time. The results of the voyage made by Flinders were well known, and when Sturt's graphic account of his trip down the Murray reached England, it fired the imagination of those looking for distant fields in which to establish peaceful homes far removed from all the strife and oppression of the homeland. In 1831 a committee was formed and negotiations opened up with the Government for a charter to found a colony. These fell through, but the scheme was not by any means abandoned. The promoters were not the kind of men to lose heart at the first rebuff. They had studied the history of colonization in Canada, New South Wales, and Western Australia, and their purpose was to avoid the mistakes made. Their intention was to start a settlement on sounder principles of political economy, and with a higher regard for the rights of colonists.

Undismayed by failure, a second committee was formed in 1834 under the name of "The South Australian Association." With the valuable co-operation of "The South Australian Company," an offspring of it, this Association "well and truly" laid the foundaton of South Australia. Colonel Torrens, at a preliminary meeting held at Exeter Hall in June, 1834, moved the main resolution—"That in establishing colonies, great care ought to be taken to combine labor and capital with land in such proportions as are best calculated to insure the prosperity of all classes of society, and that, in establishing modern colonies, this important consideration has been generally overlooked." The Colonel, in confident and eloquent phrases, spoke of the failures of colonization in the past, and explained that in the new province about to be founded the aim was to so apportion the land as to ensure success from the outset. "It is in the first place determined that the whole of the land in the colony shall be declared to be public property. No individual can, by any means, or through any interest, acquire any portion of the land by gift. Not a single acre will, under any circumstances, be given away to individuals. . . . All will be set up at a fixed minimum price, or as much above that price as the competition of public auction will determine." The theory was that of Mr. Edward Gibbon Wakefield, and his plan was by the sale of lands to provide funds; keep the new settlement in a state of solvency; supply labor; and at the same time check trafficking in land. Closer settlement was aimed at if it were not altogether accomplished. The Wakefield system—"to fix the price of land sufficiently high to create an Emigration Fund, consisting of the entire proceeds of all the land sold, and to apply such fund to the exportation of laboring emigrants" —upon which South Australia was founded, and to which great importance was attached by pioneers, fell into disfavor owing to the financial crisis of the early forties. This ideal of colonization, if one may so term it, has been subjected to

considerable criticism, but the principle of utilizing a portion of the revenue derived from land sales to induce immigration was followed for some years. On April 22, 1853, a leading article was published in the "Register" under the heading "Superiority of the South Australian land sale system." It was stated inter alia:— "Sad as were the immediate prospects for South Australia when drained of the industry of a large portion of her population at the first outbreak of the gold discoveries in Victoria, infinitely worse would it have been for her had not the previous working of her admirable land sale system furnished a moral guarantee for their eventual return. It was that which gave its crowning value to the restorative instrumentality of our providential Bullion Act. . . . To feel convinced how strong is this desire to purchase Crown lands, and how eagerly the people avail themselves of the extreme facilities which our Government has wisely provided for its gratification, it is enough to look at the sales which have latterly been effected of South Australian lands. In the year 1852 there were sold upwards of 85,000 acres, realising £99,081. A grand total of 52,913 acres of Crown lands was sold during

The Adelaide Railway Station.
A. Vaughan, Survey Dept., photo.

the first three months of the present year, realising an aggregate amount of £65,906, being at the rate of upwards of a quarter of a million sterling per annum. . . . Though we may not be able to invite to particular spots where gold may be grubbed up wholesale in its native state, we can offer the far more important attractions of an immense extent of first-rate land of which moderate-sized sections can be purchased of the Government any day of the week at £1 per acre, and the industrious cultivation of which will bestow upon its possessors in the long run more health, more wealth, more happiness, and more wisdom than the precarious and unimproving search for nuggets in the gullies and mountain ranges of the gold regions of our squatter-oppressed and land-cultivation-prohibiting sister colony of Victoria." Many of those who now so strongly condemn the Wakefield principle owe their presence in South Australia to the help it gave them to cross the seas. Mr. Dutton, writing of it in 1846 said: "That this (Wakefield) system was a sound one and worked successfully is now not a matter of doubt, but of historical record; but it is equally certain that its early operations were fraught with difficulty and trial." The principle somewhat outgrew itself as the province progressed, and it had to be

modified. Mr. Rowland Hill, the secretary to the Board of Colonization committee put his finger on the weak spot of the Wakefield theory, as a theory. "There is an essential difficulty," said Mr. Hill, "namely, the necessity for selling land, or doing that which is equivalent to the sale of land, which no one knows anything about." The Act of Parliament provided that a minimum of £35,000 had to be raised by land sales, and, like many other principles, the great difficulty about that put forward by Mr. Wakefield was in its practical application. His system was a splendid inspiration for the orator, whilst the enthusiasm of the British taxpayer was thoroughly aroused in a scheme of colonization which represented neither expense nor risk for him. But the map of South Australia was a blank. The Commissioners knew nothing about the country, quality of soil, or climate. It is not surprising, therefore, that eighteen months after King William had assented to the Act, 102 land orders out of a total of 347 remained unsold. A crisis was reached which threatened to nip in the bud the new method of settling distant portions of the Empire. At this critical period Mr. George Fife Angas, a member of the Board of Commissioners, came to the rescue, and justly earned the title since applied to him—"The Father of South Australia." It was his creative brain that outlined the basis upon which the South Australian Company was founded; it was because of his faith in his own plans that that company was established, and the province of South Australia emerged from the nebulous stage and became a reality. For years the South Australian Company carried the province of South Australia on its back. In his herculean efforts to make a success of the colonization scheme Mr. Angas kept five leading principles in the foreground:—(1) The exclusion of convicts; (2) the concentration of the settlers; (3) the taking out of persons of capital and intelligence, and especially men of piety; (4) the emigration of young couples of good character; (5) Free trade, free government, and freedom in matters of religion.

At a meeting held at 19, Bishopsgate Street, London, on October 9, 1835, Mr. G. F. Angas and four other gentlemen approved of the draft prospectus of the "South Australian Company," which provided for:—"FIRSTLY—The erection upon their town land of wharfs, warehouses, dwelling houses, &c., and letting and leasing the same to the colonists, or otherwise disposing of them. SECONDLY—The improvement and cultivation of their country land, and the leasing or sale of part of it, if deemed expedient, and the sub-letting of their pasture land at advanced rates. THIRDLY—The laying out of farms, the erection of suitable buildings thereon, and letting the same to industrious tenants on lease, with the right of purchase before the expiration of such lease at a price to be fixed at the time the tenant may enter. FOURTHLY—The growth of food for European markets. FIFTHLY—The pursuit of the whale, seal, and other fisheries in the gulfs and seas around the colony, and the curing and salting of such fish as may be suitable for exportation. SIXTHLY—The salting and curing of beef and pork for the stores of ships and for the purposes of general export. SEVENTHLY—The establishment of a bank or banks in or connected with the colony of South Australia, making loans on land or produce in the colony, and the conducting of such banking operations as the directors may think expedient." Mr. George Sutherland, M.A., in his "Study in Colonization" gives in detail the history of this company, which has had so great a hand in shaping the destiny of South Australia. The story of splendid pioneer work need not be repeated here. Suffice it to say that but for the company, the province in its early days could hardly have escaped destruction on financial rocks. The association has been well repaid for the enterprise and patience of its promoters, and well it deserved to be.

At a critical stage of the preliminary proceedings this company purchased sufficient land at 12s. per acre to enable the Commissioners to comply with the Act of 1834—"to erect South Australia into a British province, and to provide for the colonization and government thereof." Thus was the way made clear for the

practical work of colonization. The first ships were soon on the berth, and with their departure the province of South Australia was successfully launched. Here, again, the South Australian Company led the way.

"A free country for independent, liberty-loving people." That, in effect, was the alluring promise held out. That in reality was the corner-stone of the foundation of South Australia, upon which a great structure is still in course of building. The new province when it first saw the light was free from any "birthstain." It has continued free ever since. The Act of establishment said: —"That no person or persons convicted in any Court of Justice in Great Britain or Ireland, or elsewhere, shall at any time, or under any circumstances, be transported as a convict to any place within the limits hereinbefore described."

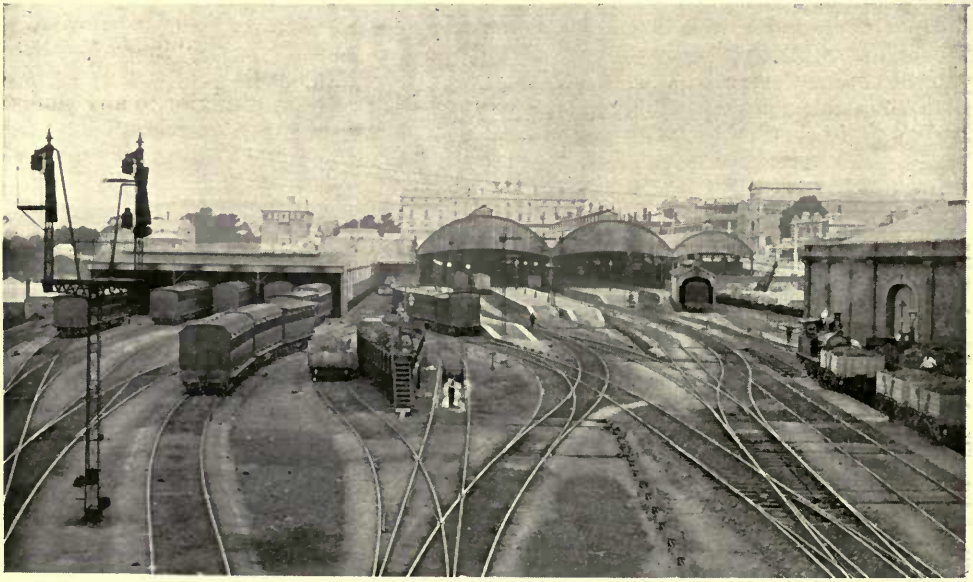
The leading principles of the legislation which authorised the settlement were that South Australia should not be a charge upon Great Britain; that no convicts should be transported, and no state church established. An attempt to violate the latter principle a few years later was warmly and successfully resisted. The province was also favored with trial by jury from the outset, the full right of which privilege it had been found necessary to withhold in neighboring colonies. The first court of gaol delivery was held as far back as May 13, 1837. The presiding Judge was Sir J. W. Jeffcott, subsequently drowned at the mouth of the Murray. In his address to South Australia's first jury, His Honor congratulated the free inhabitants of the colony in being able to claim as their birthright that most valuable privilege of the British Constitution—trial by jury. The judge went on to say:— "The only obstacle which seemed at first sight to interpose itself was the presumed difficulty of procuring in so new a colony a sufficient number of intelligent gentlemen to take upon them the highly important duties which you will have to discharge. That difficulty was, however, at once obviated in my mind after I had been a few days amongst you, and I had seen and conversed with the very many respectable colonists whom I had had the pleasure of meeting in private society, and amongst the many interesting and novel features which the formation of the colony presents it is not the least interesting that, within four months of the landing of the Governor and the first colonists on these shores—shores hitherto untrodden by the foot of civilised man—there were found the means of assembling together a number of gentlemen capable of constituting a grand and petit jury, who, in point of intelligence and respectability are, I will venture to say, not inferior to any similar body seen in the mother country." That of itself constitutes a remarkable tribute to the character of the early settlers—a testimony which the pioneers justified in every particular.

Free passages for emigrants; land sales to cover the outlay, were the underlying principles of the unique experiment tried in the colonization of South Australia. The South Australian Company came to the assistance of the Commissioners, fitted out ships with stock, stores, and practical men. The Company led the way in everything, introducing sheep and cattle; importing seeds and plants; establishing a bank and finding money when funds in the public treasury had dwindled until on one occasion only eighteenpence remained. The Treasurer of the day on arriving at his office on that eventful morning found the soldier on guard helplessly drunk.

Proclaiming the Province.

Captain Hindmarsh, R.N., was gazetted Governor of the new province of South Australia on February 4, 1836. A month later the "Cygnet," 239 tons, left London, having on board Mr. (afterwards Sir George) Kingston, Captain Lipson, R.N., Dr. Wright, surgeon; Messrs. Finniss, Neale, Symonds, Hardy, and Cannan, surveyors; Mr. T. Gilbert, storekeeper; Mr. John Morphett, and a number of

An Interior View of the Adelaide Railway Station.
A. Vaughan, Survey Dept., photo.



Entrance to the Adelaide Railway Station.
A. Vaughan, Survey Dept., photo.

passengers. The "Rapid," 136 tons, with Colonel Light, left some weeks after the "Cygnet," but arrived at Kangaroo Island nearly a month before that vessel. Colonel Light, as Surveyor-General, with an energy characteristic of him, at once began his great labors of finding a suitable site for the capital, fixing the place for the chief seaport, surveying the country, and starting to fill up a blank map. The process is still going on. South Australia has unknown fields to be explored, vast tracts of country to be occupied, so that there are still offered splendid opportunities for courageous enterprising men.

The "Buffalo," with His Excellency Captain Hindmarsh on board, dropped anchor in Holdfast Bay on December 28, 1836. The Governor landed the same day, and under the generous shade of gumtrees close to the beach the Union Jack was hoisted, the proclamation read, salutes fired, and South Australia officially started on its course. The following is a facsimile of the proclamation :—

PROCLAMATION

By His Excellency JOHN HINDMARSH, Knight of the Royal Hanoverian Guelphic Order, Governor and Commander-in-Chief of

HIS MAJESTY'S PROVINCE
OF
SOUTH AUSTRALIA.

In announcing to the COLONISTS of HIS MAJESTY'S PROVINCE OF SOUTH AUSTRALIA the establishment of the Government, I hereby call upon them to conduct themselves on all occasions with order and quietness, duly to respect the laws, and by a course of industry and sobriety, by the practice of sound morality and a strict observance of the Ordinances of Religion, to prove themselves worthy to be FOUNDERS of a great and free Colony.

It is also, at this time especially, my duty to apprise the Colonists of my resolution to take every lawful means for extending the same protection to the NATIVE POPULATION as to the rest of His Majesty's Subjects, and of my firm determination to punish with exemplary severity all acts of violence or injustice which may in any manner be practised or attempted against the NATIVES, who are to be considered as much under the Safeguard of the law as the Colonists themselves, and equally entitled to the privileges of British Subjects. I trust, therefore, with confidence to the exercise of moderation and forbearance by all Classes in their intercourse with the NATIVE INHABITANTS, and that they will omit no opportunity of assisting me to fulfil His Majesty's most gracious and benevolent intentions towards them by promoting their advancement in civilization, and ultimately, under the blessing of Divine Providence, their conversion to the Christian Faith.

By His Excellency's Command,

ROBERT GOUGER, Colonial Secretary.

Glenelg, 28th December, 1836.

GOD SAVE THE KING.

GLENELG: Printed by authority by ROBERT THOMAS AND CO., Government Printers.

"The commission was read," wrote an eye-witness of the proceedings, "to the settlers, of whom about 200 were present. . . . The health of 'His Majesty,' 'The Governor,' 'Officers,' and 'Success to South Australia,' were given and drunk with great enthusiasm. Our National Anthem, combined with the circumstances in which it was sung, had more grandeur in its simplicity than those who only hear it at a theatre can conceive."

The boundaries of the colony at this time were comprised between the 132nd and 141st degrees of east longitude, and between the Southern Ocean and 26th

degree of south latitude. Her territory amounted to nearly 300,000 square miles, or 192,000,000 acres, including Kangaroo Island, which contains 2,500,000 acres. In 1861 80,000 square miles of land between the western boundary of South Australia and the eastern boundary of Western Australia—a tract of country then known as No Man's Land—was added, and the western boundary is now the 129th degree of east longitude. In 1863 her boundaries were further extended by the addition of what is known as "The Northern Territory," which consists of the country stretching northward from the 26th degree of south latitude to the Indian Ocean, and lying between the 129th and 138th degees of east longitude. South Australia, therefore, now extends from the Southern to the Indian Ocean, and contains an area of 903,690 square miles, or 578,361,600 acres.

Early Days.

It was not to be expected that the heterogeneous company dumped on the shores of an unknown land would work out their destiny without friction. There were naval officers who had fought under Nelson, accustomed to prompt obedience without questions being asked; soldiers who had been through the Peninsula wars and at Waterloo with Wellington; men with money, and men without money, each possessing strong individuality and a large supply of human nature. Governor Hindmarsh was a warm-hearted, bluff sailor who had served under Nelson, at whose hands he had the honor to receive a presentation sword, accompanied by high compliments for gallant conduct. He combined all the strength of the average naval officer to give orders with the weakness of the average sailor to administer civil affairs and bear with the failings of an undisciplined public. He wanted his own way over the site of the capital, and lost his temper when opposed by a gallant soldier who had won distinction under the Iron Duke. The Governor appealed to the Home authorities, but was informed that "when he applied for the office of Governor he was distinctly informed that the right of selecting the capital would be vested solely in the Surveyor-General." The little community ranged itself into two hostile camps, and a fierce wordy war took place over the site of the capital. In the preface of his "Journal of Proceedings," published in Adelaide in 1839, Colonel Light wrote:—"The reasons that led me to fix Adelaide where it is, I do not expect to be generally understood or calmly judged of at present. My enemies, however, by disputing their validity in every particular, have done me the good service of fixing the whole of the responsibility upon me. I am perfectly willing to bear it; and I leave to posterity, and not to them, to decide whether I am entitled to praise or blame." When Colonel Light won the day it seemed as if all his fellow-colonists were bent on justifying the theory of the great German philosopher, that as soon as a man does anything remarkable "there is a general conspiracy to prevent him doing it again." Colonel Light was worried into an early grave, and if his wishes as a man of retiring disposition were that he and his work might be speedily forgotten, those wishes have been singularly respected. Time has vindicated him and the work he did. Efforts have been made at various periods to erect some substantial memorial to perpetuate the memory of the man who fixed the site and laid out the capital of South Australia. Possibly a feeling that no such emblem is needed partly explains why nothing has been done, and even the modest monument at his grave has been permitted to crumble away. "If you seek his monument, look around you," is after all the most enduring reminder the fortunate dweller in the cleanest and most beautiful city in the Commonwealth is able to convey to the visitor. A number of leading citizens are now endeavoring to remove this reproach of ingratitude and a worthy memorial of Col. Light is promised.

The Pioneer as Pathfinder.

"What a land is this to which you have sent me! The loveliness and glory of its plains and woods, its glens and hills! But of these you will hear from others. I cannot, however, leave it out of my estimate of God's goodness to me, that He has placed me in so fair and sweet a portion of His earth." So wrote the Rev. T. Q. Stow to the Colonial Missionary Society. A keynote of gratitude was struck by many others, who wrote in glowing terms of the beauty of the new land. Some of the chroniclers of the day had lively imaginations. One authority declared that "the atmosphere is not subject to those sudden vicissitudes of heat and cold that we have in England," and that "throughout the summer hardly a week occurs without the most refreshing showers." The same author wrote in 1839:—"Colds and coughs are almost unknown. Locusts are plentiful, but not injurious. Mosquitoes are of no serious inconvenience." It is also curious to read the following:—"Holdfast Bay will always be the place of landing and embarkation for passengers, saving the circuitous voyage to the port of landing." At one time the River Torrens, which trickles its way towards the sea dividing the city proper from North Adelaide, was described as a mighty stream. Some of the early plans showed vessels snugly at anchor behind where now stands Government House! It was originally intended to connect the city with the sea by means of a canal, and surveys were made with that end in view. On the site intended for the waterway now grow tall gum-trees, which afford a breakwind and shade for travellers between Adelaide and Port Adelaide.

Waterfall in the Mount Lofty Ranges, near Adelaide.
Ernest Gall, photo.

The "Pilgrim Fathers" were well represented among the early settlers. They were "self-selected" colonists—men who felt that they were hampered in the Homeland. Pride of race was a dominant characteristic, but stronger still was their love of liberty. They possessed physical and moral courage to an unusual degree, cool determination in the face of all difficulties. Of the pioneer it may truly be said that he was—

> One who never turned his back, but marched breast forward,
> Never doubted clouds would break;
> Never dreamed though right were worsted wrong would triumph,
> Held, we fall to rise; are baffled to fight better; sleep to wake.

Troubles soon began, but the pioneers emerged triumphant and made substantial progress when once initial difficulties were overcome. For many months the first settlers had been huddled together on small vessels lacking in everything

A. Vaughan, Survey Dept., photo. *A View of Adelaide, looking south-east from Victoria Square*

that helps to modify the discomforts of a long sea voyage. When the landing took place on the shores of Holdfast Bay each family had to shift for itself. Some had tents, others had to imitate the natives and build bough wurlies. When a move was made to the spot where the splendid city of Adelaide now stands, women and children had to walk and carry as much of the household furniture as they could. The men placed the balance on wheelbarrows, which they had to push through five or six miles of scrub. Then came the "reed hut period." Houses of all shapes and sizes were made from reeds growing in the River Torrens, and for some time colonists clustered together, making occasional excursions back to the landing place, or down to where Colonel Light had decided the chief seaport of the new province should be established.

The time soon arrived when the practical work of colonization with all its accompanying privations had to be faced. When it came there was ready as fine a band of stalwart men and noble women as ever set out to subdue a wilderness or wrest from Nature her choicest gifts. As the pioneers pushed out into the country they caused the sunlight to break through the dark clouds which by this time hung like a pall over the little city of reed huts clustering together on the banks of the Torrens. The crack of the bullock-driver's whip as he turned his leaders northwards, the music of the axe as roadways were made through the bush, stirred the colonists to fresh activity and filled them with new hopes. The advance guards of civilization moved outwards from the new centre of settlement, and the colonization of South Australia began.

The hardships endured, the failures which came in place of success, only served to prove the mettle of the sturdy pioneers who so well and truly laid the corner stone of a great structure, which at the end of sixty-six years typifies national progress and prosperity. The hottest day was not too hot, the longest journey not too long, the bush was not too dense, nor the hill too steep for the men and women who had turned their backs on the newborn city. The pathfinders for posterity moved out towards the unknown, to conquer the bush, bridge the ford, and pave the way for their children and their children's children. By unremitting toil, with primitive appliances, backed by rare patience and endurance, they created the magnificent heritage which is ours to-day.

> Men the workers, ever reaping something new ;
> That which they have done but earnest of the things that they will do.

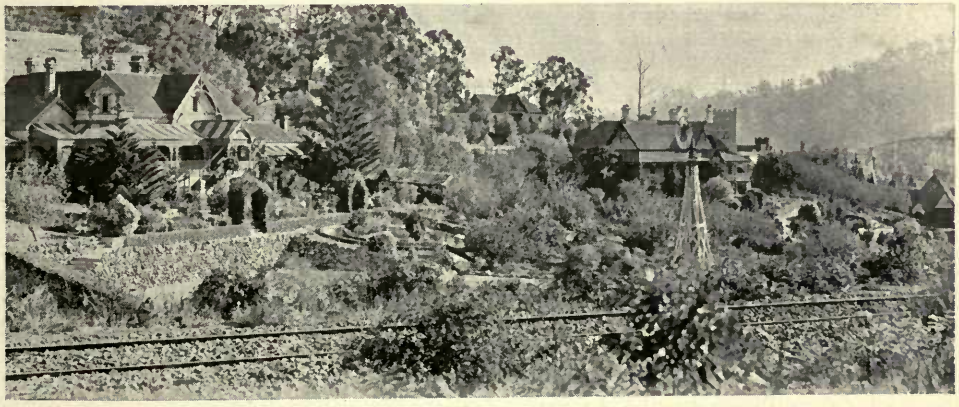
The sons and daughters of the pioneers have well maintained the family reputation. Nowhere in the British Dominions is a better stamp of colonists to be found than in South Australia. The work of colonization still goes on, only more vigorously and systematically than in the early days. Growth is sometimes checked, but the movement is ever outward. The stockman, the miner, the farmer, seek fresh victories out in the heart of our great continent, where there is almost unlimited room for expansion. Central Australia possesses a vast treasury of wealth awaiting exploitation by capital and labor. The pathfinders have made the way easy and safe for those who come after them. Roads cross and recross one another, and form a perfect network of communication. From Adelaide to Port Darwin there stretches a telegraph wire—the pioneer connecting link between the old world and the new. Railways have been built and rivers bridged. Newcomers have but to enter and take advantage of the splendid self-denying labours of the early settlers.

The Climate.

THE climate of South Australia is one of the healthiest in the world. No serious epidemic has ever visited this State, which shares with Tasmania the lowest death-rate in the Commonwealth. The territory of the State, extending south to north from sea to sea over 26 degrees of latitude, wedged in between the States of Victoria, New South Wales, and Queensland on the east, and Western Australia along the whole length of the western boundary, is, as may easily be imagined, subject to great variations of climate. The temperate zone of the southern portion corresponds very closely to the climate of Italy, while in the northern part tropical conditions prevail. Notwithstanding the extremes of heat and cold, ranging from a thermometer of occasionally over 100° in the shade down to say 40 or 50°, the weather is delightful and invigorating. In midsummer, when the heat is greatest, the air is generally clear and dry, and owing to this dryness a temperature of 110° in the shade in South Australia is not nearly so oppressive as is 90° in a moister climate. The extreme heat of summer seldom extends for more than a week without a cool change setting in. Dwellers in the city and suburbs can at all times within an hour reach localities in the hills or at the seaside, where the temperature is lower. December, January, and February are the hottest months of the year. November and March are also hot, but the nights are cooler, and the heat is seldom of long duration. "The summer" (says Sir Charles Todd, Government Astronomer for many years) "may be regarded as extending from October to March. After that month the temperature falls rapidly. The weather during April and May is simply perfection, and the same applies to most of the winter and till the end of October." The coldest months are June, July, and August, but so equable is the climate that it is never necessary to house and artificially feed the sheep, cattle, and horses, as is done in cold countries. The mean temperature during June, July, and August over a period of 43 years was 53·5, 51·5, and 54·0 respectively. Sir Charles Todd remarks—"During these months, and occasionally even in September, there are frosts, especially on the high-lying plains to the north." The mean temperature for the summer months—December, January, and February—is 71.3, 74.2, and 74.0. The thermometer exceeds 90°, on the average, on eleven days in December, ten days in January, and nine days in February. "The extreme dryness of the air," says the Government Astronomer, "renders the heat very bearable and healthy." Fruits and cereals of every kind grow luxuriantly, and live stock are almost entirely free from disease. In the interior, where the heat during the day is greatest, the nights are delicious, and fully compensate for the vigor of the sun. Explorers and travellers have experienced no difficulty in penetrating into the heart of Australia, and station hands and drovers living in the country for years at a time seldom know what an illness is. It is recorded of one exploring expedition that no occasion arose to open the medicine chests with which the party had been supplied. The explorers spent many months in travelling about Central Australia, and although enduring the usual hardships, the general health of all the party was perfect. In the hills, which form so beautiful a background to the City of Adelaide, the weather is delightful in the summer. These districts are connected by railway and excellent roads. The handsome residences of wealthy colonists and the well-kept orchards add to the great natural beauties of the mountains, which are largely resorted to by citizens on holidays and on Saturdays and Sundays. The "National

Park," comprising 2,000 acres of beautiful fern glens and wooded hills, is situated in these high lands, and throughout the whole year form a huge playground for the public. So favorable is the climate in the ranges that shrubs from all parts of the world thrive well, and some of the finest landscape gardens in Australia are situated on the slopes of these hills.

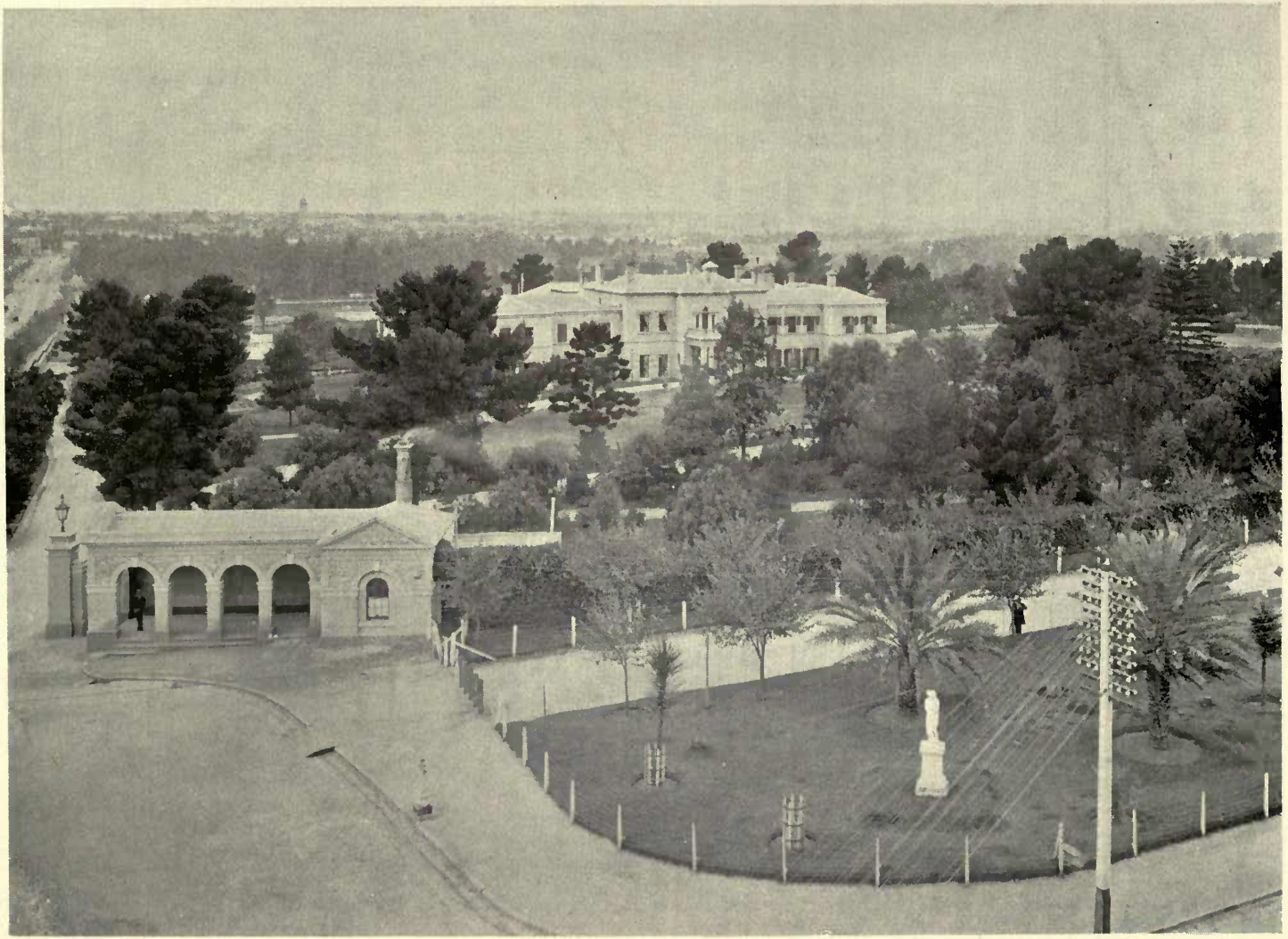
Nothing could be further from the truth than to assert, as some travellers have done after a flying visit, that the climate of South Australia is "hot and oppressive." The thermometer readings placed in comparison with the records in other countries afford no guide, because other conditions are not similar. Field sports are freely indulged in a shade heat of over 100°, and on account of the clear, dry air, the hottest day in South Australia is not so enervating as is a lower temperature range in a humid climate.



Typical Residences in the Hills—View at Mt. Lofty.
Ernest Gall photo.

Government.

SINCE the proclamation of the province there has been a complete political evolution from a mild form of despotism to a democracy represented by adult suffrage and a secret ballot system. The political constitution of South Australia underwent a remarkable change more than half a century ago, and improvements have taken place at intervals. For several years colonists had no voice in the government of the new settlement. The Act constituting South Australia a British province, passed in 1834 in the reign of King William IV., provided that a Constitution should be granted to the inhabitants "as soon as they numbered 50,000 souls." Under this Act a Board of Colonization Commissioners was appointed in London. This Board controlled land sales and emigration, and for a brief period exercised considerable authority in other directions. Until 1851 executive control was vested in the Governor and a Council —appointed by His Excellency, and dominated by him. The Council was nothing more than a convenient buffer. The Governor had all the power of an autocrat, and occasionally he exercised it in a manner which often threatened the peace of the little community of independent, strong-willed settlers. After 15 years' experience of indirect management by a Board 16,000 miles away, in a period when communication was intermittent, and direct government on the spot was vested in one man responsible only to the Imperial authorities, who knew little of colonial affairs, and appeared to care less, the people were ripe for a change. When it came it partook more of a political revolution than a constitutional evolution. In 1851 a measure of self-government was substituted for the yoke of Imperial dictatorship, and so greatly did the people appreciate the freedom that they soon began to ask for more. The population at that time consisted of 66,538 persons—37,321 males and 29,217 females. A good story is told concerning this first Constitution. Mr. George Fife Angas was about to leave London for South Australia, and he applied to the Colonial Office to be allowed the honor of conveying the parchment to Adelaide. This was contrary to precedent, so the important document was sent from the Colonial Office in charge of a clerk, who was instructed to take it on board the "Ascendant" and deliver it into the hands of the captain. The master was ashore, and as the ship was on the point of sailing, the clerk, either through negligence or from not understanding the importance of the papers with which he was entrusted, gave the package to a steward, who being very busy thrust it into the nearest place of safety. The ship sailed, and if the captain gave a thought to the matter at all, he merely supposed that there had been some delay or fresh arrangements had been made. On arrival in Adelaide, the proper authorities went on board to demand their Constitution and receive it with due honor, for advices from England had informed them that it would arrive in the "Ascendant." The captain, of course, protested that he had seen nothing of it, and there was a great hue and cry for the lost Constitution, until one day shortly after, in turning out the captain's soiled linen for the laundress, it was found, to the great amusement of everyone, at the bottom of the bag, where the steward had hurriedly placed it for security!



McGann photo. *Government House, North Terrace, Adelaide, the official residence of His Excellency the Governor.*

The Imperial Act authorised the formation of a Legislative Council not exceeding 24 members, one-third of whom were to be nominated by the Governor, and two-thirds elected by householders and property owners. The qualification for membership in the first legislature was a freehold property of the annual value of £100, or of the total value of £2,000. This Council had distinct limitations, having no power to deal with the land, which remained in the hands of the representative of the Imperial Government. During the next few years political growth was rapid, and in 1853 a Bill constituting a bicameral legislature was passed, but was disallowed. By 1856, however, the pioneers were in possession of a Constitution, the essential principles of which still remain. In that year the bicameral system of government was introduced, for the Act of 1856 created two houses—a Legislative Council, consisting of 18 members, elected on a property qualification franchise, the whole province voting as one electorate; and a House of Assembly, composed of 36 members, elected on a manhood suffrage basis. The qualification for members of both Houses and electors was the same as it is to-day. A member of the Upper Chamber is required to be thirty years of age, born a British subject, or naturalised, and resident in the State for at least three years. An elector must be 21 years of age, and the possessor of a freehold estate of the value of £50, or a leasehold of £20 annual value with three years to run, or be the occupier of a dwelling-house of £25 annual value. Unsuccessful attempts have been made during recent years to modify this franchise. A member of the other Chamber is only required to have the qualification of an elector, viz., he must be a British subject, or naturalised, of the age of 21 years, a resident of five years. The membership of the Council was increased in 1873 to 46, in 1884 to 52, and subsequently to 54; but under a scheme of economy and as an outcome of federation, a reduction was made to 42 in 1901. Manhood suffrage obtained from the outset in respect to elections for the House of Assembly, and the only variation was the political emancipation of women in 1894, which made the franchise for that Chamber adult suffrage. Women vote for both branches of the legislature under the same conditions as men. In 1887 the system of payment of members was introduced, under which legislators are each paid £200 a year. There are now four Ministers, who receive £1,000 each a year. The State Parliament is triennial, with annual sessions.

The last general elections were held on May 3, 1902, when the voting was as follows:—

For the Legislative Council.

On Roll.		Voted.		Percentage Voted. 1902.	
Males.	Females.	Males.	Females.		
38,419	13,497	29,952	7,921	Males	77·96
Total.		Total.		Females	51·27
51,916		37,873		Totals	72·95

For House of Assembly.

On Roll.		Voted.		Percentage Voted. 1902.	
Males.	Females.	Males.	Females.		
76,899	72,020	53,410	36,508	Men	69·45
Total.		Total.		Women	50·65
148,919		89,918		Totals	60·38

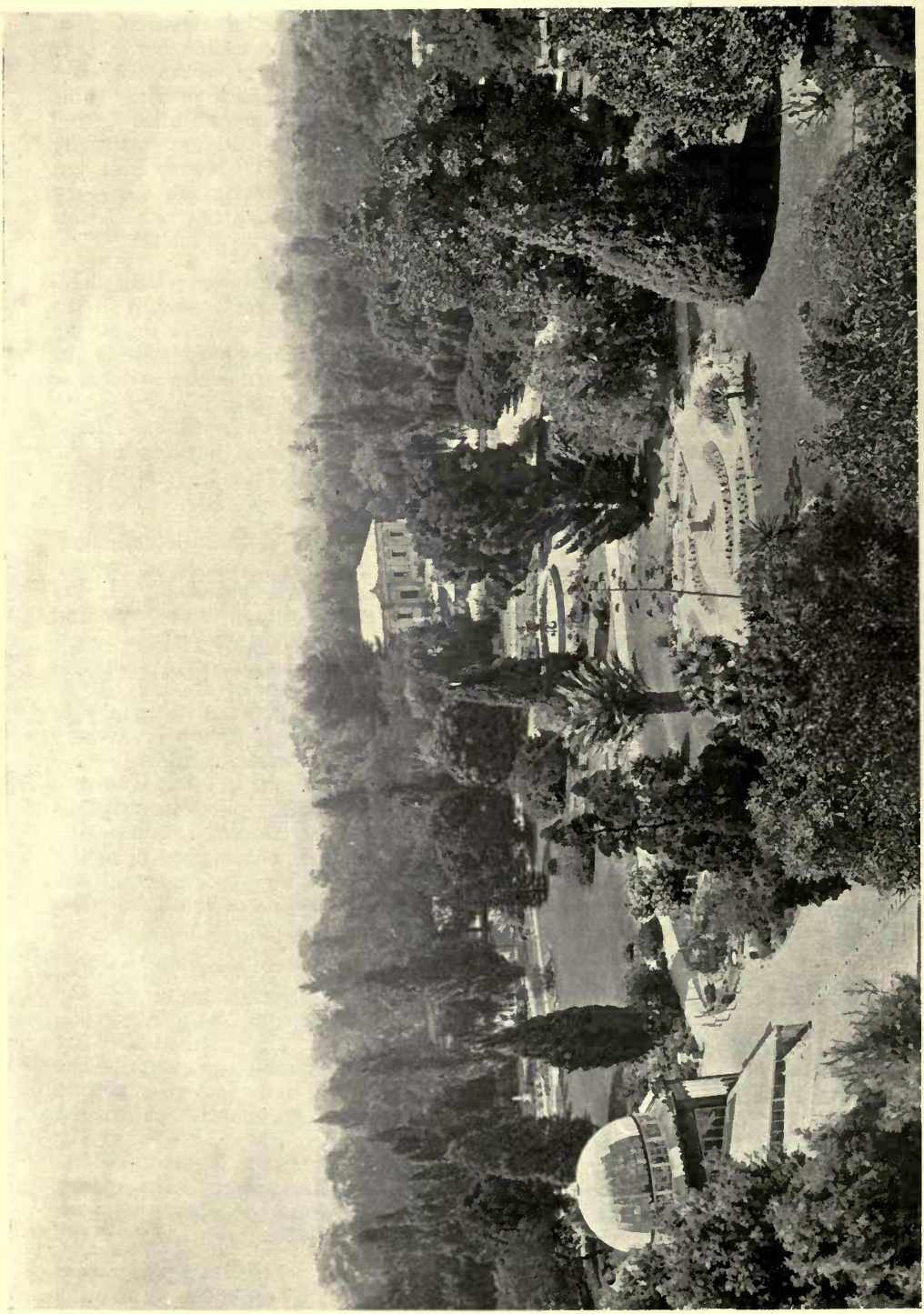
The power of both Houses is co-ordinate, excepting that Bills for appropriating any part of the revenue, or for imposing, altering, or repealing taxation, must originate in the Assembly. An attempt on the part of the Upper Chamber in 1857 to exercise a supposed authority to amend a Money Bill was strenuously and successfully resisted. A great political battle, which shook the little province to its very foundations, took place in the year named over the "Tonnage Duties Repeal Bill," and in order to avoid the repetition of such a struggle it was eventually arranged that the Council should not claim the right to "amend" Money Bills, but should formulate "suggestions." The compact entered into nearly half a century ago has been honorably observed ever since, and disputes between the two Houses are unknown.

The legislative machinery created in 1856, and improved as occasion required, has worked with perfect smoothness. The "will of the people" prevails in the election of members of the legislature, and the power of Parliament is practically absolute. There has never been a serious conflict between the representative of the British Crown and his advisers, and the power of the Imperial authorities to disallow Acts passed by the local legislature is rarely exercised. From the outset South Australia has been fortunate in its Governors, Parliament, and Ministers. Their respective powers have been wisely exercised, and the political freedom enjoyed with the opportunities provided for social and industrial progress leave little to be desired.

South Australia has led the way in several important reforms, having been the first State of the Australian group to enjoy elective houses, manhood suffrage for one chamber, voting by ballot, payment of members, and woman's suffrage. It was also the first of the States to adopt the principle of taxation of land values, granting the municipal vote to women, legalising marriage with deceased wife's sister, separating Church from State by abolishing State grants to religion, and passing the Real Property Act. The objects of the Real Property Act—the creation of Sir R. R. Torrens—at one time Registrar-General—are to give security and simplicity to all dealings with land, by providing that the title shall depend upon registration; that all interests shall be capable of appearing or being protected upon the face of the registry, and that a registered title or interest shall never be affected by any claim or charge which is not registered. By this system every one who acquires any estate or interest in land, upon being registered as owner thereof, obtains a title absolutely secure as against every one whose claim does not appear upon the registry; and the two elements of simplicity and security as regards the acquisition of land appear to be effectually attained. The Real Property Act of South Australia has been copied by all the Australian States and in other parts of the world.

The ballot system was invented by the late Mr. W. R. Boothby, C.M.G., Chief Returning Officer, who for over 50 years was an esteemed member of the Civil Service of the State. His scheme has since been adopted by all the Australian States, and is largely in use in the United States of America. The method of voting is as follows:—Each elector is given a voting paper containing the names of the candidates, with a square set opposite each name. The voter enters a private apartment and puts a cross within the square opposite the name of the favored candidate. The folded paper is handed to the Returning Officer and he, in the presence of the voter, drops it into a sealed box. Secrecy is thus assured, and no matter how high political feeling may run at election time, there is the utmost decorum within the polling booth. No electors need have the slightest apprehension in approaching a polling place to record his or her vote.

South Australia also led the way in a very fine system of local self-government by means of Municipal Corporations and District Councils. These bodies, in addition



A View in the Botanical Gardens, Adelaide.

McGann photo.

to having control over streets and certain roads, are vested with considerable local authority. In addition to fostering the important principles of self-government, the plan has encouraged self-help among people in remote districts, and has had the effect of lightening the labors of the State legislature regarding matters of local concern, whilst relieving the central government of much detail administration. The total amount of the assessment for the thirty-two Municipal Corporations for the year 1902 amounted to £1,195,990, as against £1,032,163 in 1893. The rate declared in the pound varied from 1s. in the country to 1s. 9d. for the city, producing £82,996. There are 141 District Councils, with a total assessment of £1,433,036, as compared with £1,529,643 in 1893. The rate declared in the pound varies from 5d. to 1s. 4d., producing in 1902 £63,950.

The last, but by no means least, significant evolution in the methods of government was the inauguration of the Commonwealth of Australia, on January 1, 1901. South Australia was always strongly federal in sentiment, and exercised considerable influence at every stage of federal evolution. At the various conferences and conventions the South Australian representatives stood out prominently for a united Australia. When the Commonwealth Constitution was submitted to the electors of South Australia for approval, 65,990 electors voted for union, and 17,053 against. South Australia enjoys the right to elect six members to the Federal Senate, and at present seven members to the House of Representatives. There is equal representation of all States in the Senate, but membership in the other chamber is regulated by population. The Commonwealth has control over Customs, the Post Office, and immigration. The State retains the right of administering its own land laws and other forms of taxation other than Customs duties.

The following shows the divisions of the State for both houses of legislature and the members:—

Legislative Council.

District.	Division.	Members.
CENTRAL—	Adelaide	Hon. George Brookman.
		Hon. Joseph Vardon.
		Hon. Henry William Thompson.
	Port Adelaide	Hon. Robert Storrie Guthrie.
	Torrens	Hon. Andrew Alexander Kirkpatrick.
		Hon. Hugo Carl Emil Muecke.
SOUTHERN—		Hon. Sir John Lancelot Stirling, K.C.M.G., LL.B. (President).
	Victoria and Albert	Hon. George Riddoch.
	Alexandra	Hon. Alfred von Doussa.
	Murray	Hon. John Hannah Gordon, K.C. (Attorney-General and Minister of Education).
NORTH EASTERN—	Barossa	Hon. John James Duncan.
		Hon. Thomas Pascoe.
	Wooroora	Hon. Edward Lucas.
	Wallaroo	Hon. John Warren.
NORTHERN—	Stanley	Hon. James Henderson Howe.
		Hon. Arthur Richman Addison.
	Burra Burra	Hon. John George Bice.
	Flinders	Hon. John Lewis.
	Northern Territory	

House of Assembly.

District.	Members.
Adelaide—	Lewis Cohen. William Joseph Denny. Hugh Robert Dixson. Johann Theodor Scherk.
Port Adelaide—	Ivor McGillivray. William Oliver Archibald. Thomas Henry Brooker.
Torrens—	John Darling, jun. (Leader of Opposition). Frederick William Coneybeer. Hon. John Greeley Jenkins (Premier and Chief Secretary). George Klewitz Soward. Thomas Price (Leader of Labor Party).
Victoria and Albert—	John Livingston. Archibald Henry Peake. Andrew Dods Handyside.
Alexandra—	Alexander McDonald. Charles Tucker. William James Blacker. George Ritchie.
Murray—	Walter Hughes Duncan. Robert Homburg. Friedrich Jacob Pflaum.
Barossa—	Ephraim Henry Coombe. Hon. Richard Butler (Treasurer, Commissioner of Crown Lands, and Minister of Mines). William Gilbert.
Wooroora—	Hon. Sir Jenkin Coles, K.C.M.G. (Speaker). David James. Friedrich Wilhelm Paech.
Wallaroo—	John Verran. Peter Allen. John Wallace Shannon.
Stanley—	Hon. Alfred Catt (Chairman of Committees). William Patrick Cummins. Frederick William Young, LL.B.
Burra Burra—	Hon. Laurence O'Loughlin (Government Whip). William Miller. Hon. William Benjamin Rounsevell.
Flinders—	David McKenzie. Thomas Burgoyne. Hon. Richard Witty Foster (Commissioner of Public Works and Minister of Industry).
Northern Territory—	Charles Edward Herbert. Samuel James Mitchell.

The Primary Producer's Record

SOUTH AUSTRALIA is a country where the primary producer is King. His sovereignty is undisputed, his reign continuous. Upon the products of the soil the prosperity of the people depends. The flockmaster with his sheep, the herdsman with his cattle, the tiller of the soil with his cereals and fruits, have made South Australia what it is to-day, one of the most self-contained and prosperous States in the Commonwealth of Australia.

From the earliest days of the State's history primary products have been the dominating factor of national progress. Were seasons favorable and harvests bountiful? then the merchant, the trader, the professional man, and the laborer, down through all departments of industry, participated. Did the droughts come and blight the cereal crops, and cause mortality among the flocks and herds? the evil influence was felt by all.

Notwithstanding the initial handicap of a handful of people having to control and develop so vast a territory; in spite, too, of periods of falling markets—the primary producer has a splendid record to his credit.

The following is a statement of the declared value of the staple exports of the State during 1901 and 1902, with the aggregate value of each class from the first exportation of the several products and manufactures of the State to 1902, inclusive (arranged under twenty-seven heads):—

Articles.	1901. £	1902. £	Aggregate. £
Wool	1,029,063	782,065	59,650,441
Flour	440,226	397,755	27,877,856
Wheat	839,731	744,680	25,735,509
Copper ore and metal	491,617	430,712	23,507,082
Hides and skins	233,162	292,093	4,188,180
Live stock	130,230	162,642	1,965,403
Hay and chaff	75,798	481,404	1,586,108
Bark	67,601	68,850	1,545,042
Wine	92,418	124,916	1,340,126
Bran and pollard	43,872	62,505	1,198,976
Tallow	4,826	888	1,038,764
Eggs	73,520	107,739	1,016,286
Butter	17,620	23,230	606,568
Fresh fruit	62,662	37,315	601,068
Gold	16,613	50	545,657
Preserved meat	28,181	27,717	454,380
Other minerals	722	42,735	450,849
Frozen meat	58,477	95,028	263,480
Manure	3,000	4,478	207,291
Barley and oats	5,223	23,381	201,792
Honey and beeswax	2,522	8,111	138,869
Vegetables	8,063	11,278	121,046

Articles.	1901. £	1902. £	Aggregate. £
Bacon and hams	9,329	32,628	103,300
Preserved fruit	2,628	4,455	41,869
Cheese	1,258	2,424	12,213
Frozen poultry, game, &c.	1,144	2,805	7,873
Unenumerated	477,095	787,063	6,578,138
Total values	4,216,601	4,768,947	160,984,266
Imports re-exported	3,799,288	2,929,567	85,020,826
Total exports	8,015,889	7,698,514	246,005,092
Total imports	7,371,587	6,073,781	231,156,790
Imports retained	3,572,299	3,144,214	146,135,964
Combined imports and exports ...	15,387,476	13,772,295	477,161,882

The first staple exports were made in 1838; minerals were first exported in 1841, and wheat, flour, and copper in 1843.

The total value of staple produce exported to the end of 1902 amounted to £160,984,266, as outlined above.

Breadstuffs are responsible for £55,014,133; minerals for £24,000,000; wine for £1,340,126; wool for £59,650,441; and dairy produce for £1,738,467.

The production of **WHEAT** in 1902 was 6,354,000 bushels. Its value was £1,800,000. The crop now being gathered is expected to yield 14,000,000 bushels. "Owing to favorable conditions of cultivation," says Mr. Coghlan, the Australasian statistician, "a yield of seven bushels per acre is financially as satisfactory as one of 15 bushels in New South Wales or of 20 bushels in New Zealand.

South Australian **WOOL** shipments for the 1902-3 season totalled 96,524 bales.

There are now 21,692 acres under **VINES**, and the "make" in the 1903 vintage was 2,573,422 gallons of wine. Wine shipments now reach a value of over £90,000 per annum.

The **PASTORAL** wealth of South Australia is officially stated at £2,086,000; **AGRICULTURE** £3,712,000.

FLOCKS total 4,880,000 sheep; **HERDS**, 138,000 cattle, including 75,000 dairy cows. There are in the State 211,901 **HORSES**; 82,700 **PIGS**; 8,700 **GOATS**; and 1,281,000 poultry.

South Australia claims to possess some of the finest **ORANGE** groves in Australia. There are 127,762 orange trees in full bearing. South Australian oranges are shipped to London in increasing quantities every year.

The **APPLE** orchards comprise 17,000 acres. The high-water level of apple shipments was in 1901 when 73,000 cases were exported.

The export of **FROZEN MEAT** (mostly lambs) has grown from 963,763 lbs. in 1898 to 4,859,937 lbs. in 1902.

The quantity of **OLIVE OIL** made in 1890-1 was 6,838 gallons. In 1902-3 12,422 gallons.

In the average of agricultural produce per head of population South Australia leads all the other States in the Commonwealth with a value per head of £10 4s. 6d., as compared with £8 12s. 0d. for Tasmania, £7 3s. 5d. Victoria, £4 17s. 6d. New South Wales, £4 13s. 6d. Queensland, £4 11s. 10d. Western Australia.

Evening Shadows at a South Australian Sheep Station.
S. J. Dailey photo.

View of Sheep Station Outbuildings, showing woolshed at Wellington Lodge, where the River Murray enters Lake Alexandrina.
S. J. Dailey photo.

Industrial Expansion.

The material progress of South Australia has been continuous and substantial. A total population which at the present time is less than 365,000 has, in a country more than four times the size of France and more than seven times larger than the United Kingdom, subdued the wilderness; conquered the desert, causing it to blossom and become productive. At the end of sixty-six years there is a population of 362,000 persons; a public revenue of £2,646,000; a combined annual trade—imports and exports—equal to £13,772,000; 1,800 miles of railway have been built; 18,000 miles of telegraph and telephone wires are employed; 3,100,000 acres of land are annually cultivated; 21,000 are under vines; there are over 5,000,000 sheep, 225,000 cattle, and 165,000 horses in the State, whilst the staple export trade amounts to £4,768,947, and has aggregated in the sixty-six years £160,984,266.

Even this record of industrial expansion —splendid though it is—does not convey an adequate idea of the work accomplished in colonising and developing so vast a territory. When Governor Hindmarsh read the proclamation in 1836 there were 500 colonists present, and they had not begun to make history in the new country. Not an acre of land had been disturbed, roads and buildings were unknown, and expenditure was the only item entered in the national ledger. The outflow of public money so exceeded income for a few years that financial chaos resulted. A vice-regal representative was made the scapegoat. At this distance we can afford to regard the perilous period referred to as a "mere incident" in colonization—a phase through which nations pass and are all the better for the experience. The fiercer the furnace the finer the quality of the steel. Not since those strenuous days of the early forties have colonists ever had cause to question the security of a Government promissory note or doubt the future. In 1841 there was a deficiency in the accounts of nearly £300,000, and bills drawn by Governor Gawler upon the Imperial Government were dishonored. The effect of this was to stop all public works, dislocate trade, and throw a number of persons out of employment. It is the first recorded unemployed trouble in the State, and the incident gave birth to the "deputation industry" which has flourished ever since.

The check was not of long duration, for a few years later discoveries were made of rich copper deposits, and the new settlement began to forge ahead on the high road towards prosperity. Within a very little time the public income was more than sufficient to cover all outgoings. In three years the revenue more than doubled itself. The pastoral industry was rapidly expanding, agriculture was extending, mining was in a buoyant condition. A reaction set in early in the fifties, when gold discoveries were made in Victoria. This threatened to produce disastrous results to the province then entering upon its fifteenth year. The male population stampeded to the goldfields. By bullock dray, by pack horses, in traps, on foot, by sailing vessels—which sometimes occupied as many days on the voyage as it now takes the mail steamers hours to cover the same distance—there was a steady outflow of humanity until only women and children remained. There was no labor available to gather the crops as they ripened, and the natives had to be called upon to help the harvesters. Work was ever a stranger to the average Australian aboriginal, and the blacks proved poor substitutes for the pale-faced settlers now turned diggers. "Necessity" had again proved the "mother of invention." With ripe corn wasting in the fields for want of laborers, Mr. Ridley had conceived the idea of the stripper, an implement which has had a remarkable evolution and proved of incalculable benefit to the agricultural industry in Australia. South Australian strippers, vastly improved on

Mr. Ridley's model, are now to be found in all parts of Australia and in the Argentine Republic.

The critical period through which South Australia passed during the height of the gold fever was forcefully indicated in the second annual report of the Chamber of Commerce dated 1852, in which the following remarks occur:—"For a time it seemed that the props of our material prosperity were about to give way. The streets of Adelaide were deserted, houses were abandoned by their tenants, rents fell, and property became unmarketable. The shops of our retailers presented their tempting wares in vain. There was a general arrest put on all business; and this at a time when the stock of merchandise in the market was unprecedentedly heavy, and when the bill engagements of the mercantile community were larger probably than they had ever been before. At this juncture, as if to mark with greater emphasis the signs of the times, a vessel arrived at Port Adelaide from Melbourne with a number of our colonists on board who, after a few weeks successful digging at the goldfields of Victoria, had brought back with them to this colony gold dust to the value of £50,000. This they were desirous of converting into money, but such was the straightened condition of the money market that purchasers could not be found for it. A portion of it was eventually sold at 55/ to 56/ per ounce, the price at Melbourne being 60/ at the time, and the remainder was carried back to Victoria. Such a circumstance was quite sufficient to show the critical position into which the colony had been thrown. It was, therefore, desirable by every possible means to attract back again with their gains as many of the absentee colonists as could be induced to come, in order that their wealth might be rendered available for the general good; but an unexpected difficulty had to be encountered. The successful digger could not sell his gold if he brought it back, there being no money in the colony with which to purchase it. At one time the coffers in the Treasury were empty, and the civil servants had not received any pay for three months.

"It was at this time, when ruin was staring everyone in the face, and when there had already been unmistakable symptoms of an approaching run on one of the banks, that the Committee of the Chamber of Commerce held a conference with the managers of the three banking institutions with reference to the measures to be adopted to meet the appalling crisis. At this meeting the difficulties of our position were fully discussed. The radical cause of the extreme financial embarrassment which existed was acknowledged to be the sudden and uncontrollable efflux of specie, which was gradually contracting the circulation into dimensions totally inadequate to meet the wants of the community. It was considered, if the banks were permitted by law to base their issues for a time on uncoined gold at such a price as would leave a safe margin for the transmission of the gold to England and its replacement in coin, that perfect security would be offered to the public, and a palliation, if not a complete corrective, presented to the disorder which prevailed. It was perceived that such a measure, if devised, would enable the banks to afford the required banking accommodation to their customers, so that every really solvent man should have an opportunity of retrieving his position. It was anticipated that a currency so free, and yet so legitimate, would create a market for the raw gold; and that thus, which was a much more coveted desideratum, the gold-digger of South Australia would be laid under inducements to return with his auriferous treasure to this colony. It was unanimously held that we were shut up to the line of policy here indicated if we would preserve the colony from general bankruptcy and avert a catastrophe which threatened to engulf all our colonial interests, for a time at least, in overwhelming confusion. To embody these views in some definite shape it was resolved that the Chamber, in conjunction with the banks, should make an urgent application to the Government to establish an Assay Office for the purpose of assaying and converting gold into stamped ingots, to be exchanged with the banks for their notes. Such was the crude form of a scheme which ultimately resolved itself into the Bullion Act.

"The representatives of the mercantile

and banking interests, with the exception of the manager of the Bank of Australasia (the late Mr. Tomkinson), who dissented from this proposal, and would not agree to take the ingots of gold as a legal tender, immediately petitioned the Lieutenant-Governor, Sir Henry Young, to convene the Legislative Council for the purpose of taking into consideration these proposals for the relief of the colony. At once responding to the general desire, Sir Henry issued a summons for the Council to meet on the 28th of January, 1852. The welfare of the colony was in their hands. It was an anxious time for the members, as they were called upon to make a daring innovation on established rules and principles; but the Council nobly did their duty, and with but few amendments the Government ordinance was passed, and in time became law.

"And here it is only an act of justice to the Lieutenant-Governor to acknowledge the obligation under which he has laid the colonists, for having, at considerable responsibility, although at their unanimous desire, affixed the royal sanction to a measure which, however imperatively called for, and however beneficial in its operation, is apt to be looked upon with suspicion or aversion at a distance, where the peculiar circumstances which rendered it necessary, however forcibly described, can be faintly appreciated. Such an act on his part was a graceful concession to the popular will, as expressed in one of its most intelligent forms, and as such is calculated to strengthen the good understanding which ought to subsist betwixt the Government and the people."

These were exciting and critical times for South Australia, but they soon passed away. As the gold seekers began to return home the wave of depression receded even more rapidly than it had approached. Many of the adventurers came back with considerable quantities of gold to their credit in the banks. Inspector Tolmer had established his famous escort, and the much-needed yellow metal as well as miners flowed back to South Australia. An era of increased activity in all branches of industry began. The land office was once more besieged by applicants wanting broad acres, and sales of land jumped from £32,000 in 1848 to £383,000, and the public revenue from all sources stood at £595,000 in 1854. By 1851 imports from Great Britain had aggregated £3,000,000. Two years later they had increased to £5,000,000. It was during the successful regime of Governor Young that the River Murray was opened to navigation. Sir Henry was a firm believer in the Murray as a highway of trade to the interior, and it was largely due to his splendid enthusiasm that navigation was inaugurated and the possibilities of that noble stream adequately recognised. Captain Cadell had come down stream in a canvas boat, and Captain Wm. Randall, who is still alive, was engaged building a small steamer at Mannum. Captain Randell's boat, the "Mary Ann," was actually the first vessel to steam up the Murray, but the "Lady Augusta," brought round from Sydney by Captain Cadell, fulfilled the conditions which accompanied the Parliamentary offer of a bonus. Thus the reward of £4,000 went to Captain Cadell. Governor and Lady Young and party accompanied Captain Cadell on the first voyage of the Lady Augusta. At times the Murray and Darling are navigable for a distance of 3,000 miles, and, despite the combined efforts of various States to tap by railways the legitimate river trade, the waterway continues to be the cheapest means of transit for a large number of producers. In years of average rainfall the river more than holds its own against land carriage.

The forties provided a copper boom; the fifties were known as the golden decade. The population, having exceeded the prescribed limit fixed by the Imperial Act, the first Constitution Bill was passed and a Parliament consisting of two Chambers established. About the same time railways connecting Adelaide with Port Adelaide, also with Gawler and Kapunda, were begun, and the first telegraph line was erected. The extension of the telegraph went on apace, and within three years from that time wires were stretched between Adelaide and Melbourne. The ten-year period ending with 1859 was an important one in the history of the province, and progress from 1836 to that time, though spasmodic, was considerable, as is shown by the following comparisons:—

Year.	Population.	Land under Cultivation. Acres.	Revenue. £	Total Trade. £	Total Shipping. Tons.
1836	546	—	—	—	—
1840	14,600	2 687	30,618	335,436	83,787
1845	21,759	26,218	32,433	333 278	26,558
1850	63,700	64,728	238,983	1,416,389	174 000
1855	96,982	140,000	453,641	2 359,153	226,000
1859	122,735	361,884	511,927	3,163,370	216,000

The sixties provide one of the brightest chapters in the history of S.A. It was a period of great activity, of splendid achievements on the part of explorers, and glorious triumphs in the work of developing natural resources. Rich copper deposits were again discovered, this time on the northern end of Yorkes Peninsula. These have proved the most valuable mineral deposits yet found in the State. Exploring parties pushed their way north and west. On the third attempt John McDouall Stuart, the famous explorer, crossed the continent from south to north and returned over his own tracks, thus solving the problem of the interior and providing a base line from which others could operate in laying bare the mysteries of inland Australia. In 1863 the Northern Territory, a tract of tropical country consisting of 340,097,280 acres, was by Royal Letters Patent annexed to South Australia, and active operations were at once begun to settle the newly-acquired possession. Colonists were further excited by a visit from His Highness the Duke of Edinburgh, the first member of the Royal Family to cross the seas to Australia. By 1864 exports of staple produce had reached an annual value of £3,000,000, or over £20 per head of the population—a splendid achievement for a handful of people to accomplish within a period of twenty-eight years. Shipments of cereal products amounted in that year to £1,464,000; wool contributed £775,000; metals and minerals £691,000. In an official report dealing with trade in 1864 it was stated:—"Agricultural, pastoral, and mineral produce formed, as usual, the great bulk of the year's exports, and wool and copper were shipped in quantities of nearly equal value; but the breadstuffs exported were worth as much as the pastoral and mineral produce put together. This was, however, the result of exceptional circumstances, the value of cereal produce usually averaging from 10 to 15 per cent. higher than that of the other two staples. In fact, comparing the average yearly exports of each class during the past five years with the averages for the preceding similar period, it will be found that the shipments by agriculturists bore a less percentage to the value of the total exports during 1860-64 than in the years 1855-9. For instance, in the two periods, breadstuffs, &c., have decreased from 39.3 per cent. to 38.8 per cent. of the total exports of produce; minerals from 27.1 to 25.7 per cent.; and, on the other hand, wool has increased from 31.5 to 31.8 per cent."

The population increased from 124,112 in 1860 to 181,146 by the end of 1869, and the public revenue rose from £438,827 to £777,351 in the same period. In 1865 the national income exceeded a million sterling. Agricultural expansion was of steady growth. In 1860 the cultivated area was 428,816 acres; by 1869 the acreage tilled had risen to 850,576 acres. At the end of that year the total trade turnover was valued at £5,747,805. There were 4,436,000 sheep, 119,000 cattle, and 73,000 horses in the colony. Staple produce exported was valued at £2,722,438.

This forward movement was well maintained during the next decade. The industrial expansion, though less sensational in the seventies, was substantial, and in other directions some remarkable work was accomplished. In the face of numerous difficulties, and at great expense, the province—then comprising less

than 200,000 inhabitants—ran a telegraph wire through the heart of the continent, a distance of 2,000 miles. The cost exceeded half a million. The completion of this undertaking provided the first connecting link between the old world and the new. Australia has ever since been indebted to South Australia for the enterprise thus exhibited. A few years later a telegraph line connecting Adelaide and Perth was constructed. The route of this second transcontinental service followed the tracks of the dauntless Eyre, and its completion represented a second triumph for an enterprising people who were bridging the continent and increasing the means of communication. Further explorations were conducted which helped to remove wrong impressions concerning Central Australia. In political circles considerable activity was displayed, and important public works were carried out. During one session alone a loan of £3,000,000 was authorised, and Bills were passed sanctioning the construction of 380 miles of railway. Agriculturists were pushing their way northwards, and, assisted by improved transport facilities, production increased at a rapid rate. In 1875 over 500,000 acres were sold, and two years later 638,000 were alienated—the largest area dealt with in one year with the exception of 1881, when 640,000 acres were disposed of by auction.

Railway construction was pushed forward rapidly during the next few years, including the important railway connection between Adelaide and Melbourne. Trade steadily improved until combined exports and imports reached an annual value of £17,000,000. Staple produce worth £4,670,000 was sent away to oversea customers in 1888. Total acreage under cultivation rose to 2,864,000 acres in 1889, in which year 1,610 miles of railway were open to traffic. In 1887 South Australia celebrated its jubilee by holding an Exhibition, and a magnificent demonstration was given of the industrial progress made since the proclamation. The Exhibition Building cost £68,000, and was kept open six months, during which time 790,000 persons attended. The aggregate value of imports had by that time reached a total of £119,644,000, whilst exports had reached a total of £102,000,000. Towards this latter sum shipments of wheat and flour contributed £36,000,000; other agricultural produce, £1,300,000; wool, £39,000,000; and copper, £19,000,000. At the end of fifty years of colonising efforts 1,950,000 acres were under wheat; 360,000 utilised for hay, and 610,000 acres were devoted to other crops. The sheep in the province mustered 6,700,000; cattle, 389,000; and horses, 168,000. The population within the city boundary was 45,000, and in the whole of S.A. there were 308,000 inhabitants.

The eighties witnessed one of the most important industrial developments in the history of S.A. Valuable mineral deposits were discovered near the border of the province which led to a remarkable improvement in trade and exercised far-reaching influence. The great Barrier silver and tin fields—including some of the richest silver mines in the world—though in New South Wales, belonged, geographically and commercially, to South Australia. For fifteen years they have been exploited by our capitalists—large and small—by merchants and producers, and tapped by the railways of the State. Some idea of the magnitude of the business done can be gathered from the fact that in 1900 produce to the value of £2,542,000 came over the border from N.S. Wales, whilst local produce worth £1,108,000 was sent over the border in return. It was South Australian capital that opened up the leading mines, and for many years the largest interests in these great properties were held by our people. South Australian enterprise gave the Barrier silver districts railway communication to the seaboard, and ever since this State has enjoyed an immense carrying trade too and fro. The prosperous mining town of Broken Hill, with a population of nearly 30,000 persons, has provided South Australian producers with an excellent market.

There was a growth in the general trade of South Australia during the period 1881-'91, which can only be characterised as "marvellous." Mr. Coghlan draws special attention to the "marked impetus," and says that South Australian trade in

1891 represented a trade of £64/3/4 per inhabitant, "being almost without parallel in any important country." By 1890 the population had grown to 314,195 inhabitants, the public revenue reached £2,557,722; total land under cultivation stood at 2,649,098 acres; total trade amounted to £17,090,051; exports of staple produce had risen to £4,410,062.

The last decade of the century proved disastrous in many directions for the whole of Australia, and South Australia suffered in common with her neighbors. Early in the nineties financial troubles began to appear on the surface, and the year 1893 witnessed the suspension of several banks. The seasons were unfavorable, and for several years the rainfall was below the average. South Australia came through the crisis remarkably well, and, considering the severity of the drought, production was well maintained, whilst there was no appreciable increase in the list of insolvencies as a result of bank failures and bad times. By the consummation of Federation at the opening of the century the term "State" was substituted for that of "colony —or "province" as South Australians preferred to have their country described—and South Australia became a member of the Commonwealth of Australia by the voluntary act of a substantial majority of electors. The seventh decade in the history of what is now the Central State of United Australia has opened full of promise. Confidence is gradually being restored in financial and commercial circles, trade is on the up grade, and the outlook for rural producers was never brighter. There is increased activity in all departments of industry. The public revenue is buoyant—so much so that deficits are giving way to surpluses—and in all directions there is a strong demand for land and a growing disposition to encourage private enterprise.

The wonderful record of industrial and commercial growth made during the sixty-six years of South Australia's history may be gathered by a glance at the following tables. The increase of population has not been rapid, but a steady growth is shown by the following:—

	Total Inhabitants
1840	14,600
1850	63,700
1860	124,112
1870	183,797
1880	267,573
1890	314,195
1900	357,099
1902	362,000

Settlers early devoted attention to the making of roads and building railways and telegraphs. The whole of these belong to and are worked by the State. In the construction of railways alone over £13,000,000 has been expended, the gradual extension of transit facilities is thus disclosed:—

	Main Roads. Miles.	Railways. Miles.	Telegraphs. Miles.
1840	—	—	—
1853	33	—	—
1860	175	56	654
1870	597	133	1,718
1880	1,449	667	6,904
1890	4,485	1,610	12,178
1900	4,500	1,736	17,543

Production was materially assisted by the improvements made in the means of conveying goods to and from the seaboards. The "area under cultivation" has steadily expanded.

	Land under Cultivation. Acres.
1840	2,687
1850	64,728
1860	428,816
1870	959,006
1880	2,574,489
1890	2,649,098
1900	3,279,406
1902	3,122,800

Wool and wheat have been the two great staple products from the first. In later years wine has come rapidly to the front. Fluctuation in market prices has reduced the monetary returns in recent years, but a diminution in the cost of production has helped to compensate the grower:—

	Wool. £	Breadstuffs £	Wine. £
1840 ...	8,740	—	—
1850 ...	131,731	38,312	—
1860 ...	573,977	499,102	1,430
1870 ...	902,696	470,828	12,097
1880 ...	1,716,171	2,469,720	8,481
1890 ...	1,353,762	2,018,719	50,738
1900 ...	1,003,391	863,463	78,153
1902 ...	1,061,809	1,229,212	124,916

In minerals copper has easily led.

	Copper. £	Minerals. Total value of £
1840	—	—
1850	353,890	365,464
1860	420,905	446,537
1870	568,780	574,090
1880	346,174	347,246
1890	226,992	284,893
1900	394,446	431,289
1902	430,712	498,325

Animal life thrives in all parts of South Australia. There is no better climate in the world for the rearing of high-class sheep, cattle, and horses. The mildness and evenness of the temperature makes the housing of live stock unnecessary, consequently artificial feeding has never been practised. The growth of flocks and herds has been checked by droughts, but the work of restocking is now well in hand. The number of sheep, cattle, and horses in the State at the periods named is shown as under:—

	Sheep.	Cattle.	Horses.
1840 ...	200,160	15,100	1,060
1850 ...	984,199	60,034	6,488
1860 ...	2,824,811	278,265	49,399
1870 ...	4,400,655	136,832	83,744
1880 ...	6,463,897	307,177	157,915
1890 ...	7,004,642	359,938	187,688
1900 ...	5,235,220	214,761	166,790
1902 ...	5,012,216	225,256	165,303

South Australians have always enjoyed a high reputation as traders. The State has been frequently referred to as the "Scotland of Australia," a title which is intended to convey a compliment to the sagacity, honesty, and prudence of her merchants and traders. On a per capita basis of comparison there are few countries in the world that have a better trading record than South Australia. At one period—the decade 1881-'91—South Australia had an annual turnover equal to £64/3/4 per head of population—a record certainly without parellel in Australasia, and scarcely exceeded by any country. This was partly due to South Australia's geographical position enabling the State to act as carriers for other States, but the produce passed over our railways and wharfs, and the business proved profitable in other ways. The following statement is an instructive comparison—one which bears eloquent testimony to the progress and prosperity of the State:—

Year.	Value of Imports.		Value of Exports.	
	Total.	Per Inhabitant.	Total.	Per Inhabitant.
	£	£	£	£
1840	303,357	20 15 6	32,079	2 5 3
1850	845,572	13 5 5	570 817	8 19 2
1860	1,639,591	13 4 2	1.783 716	14 7 7
1870	2,029,793	12 1 8	2 419 488	13 3 3
1880	5,581,497	20 17 2	5,574,505	20 16 8
1890	8,262,673	26 5 11	8,827,378	28 1 0
1900	8,034,552	22 9 11	8,029,157	22 9 8
1902	6,073,781	16 15 7	7,698,514	21 5 4

The expansion of the export trade in articles the produce of the colony is an inspiring record:—

Year.	Staple Exports. £	Average per head of Population
1838	5,040	£0 16 10
1839	9,165	0 18 4
1840	15,650	1 1 5
1845	131,800	6 1 2
1850	545,040	8 11 2
1855	686,953	7 1 8
1860	1,576,326	12 18 6
1865	2,574,657	17 11 9
1870	2,123,297	11 11 0
1875	4,442,100	21 11 0
1880	4,829,577	18 0 11
1885	4,385,599	14 6 5
1890	4,410,062	14 0 8
1900	3,610,517	10 2 2
1902	4,768,947	13 3 5

The value of "total trade per head" stood for South Australia at £35/9/10 in 1881; £64/3/4—the highest for Australasia—in 1891; and £42/19/7 in 1901. On a per capita basis of comparison ranks second highest among the States for exports of staple produce and total trading.

The growing trade of the State required the services of a large fleet of ships, and in no direction has there been a more remarkable evolution than in the class of vessels trading to our ports. The number and tonnage of vessels entering and leaving South Australian ports is set out below:—

	Number of Vessels.	Tonnage.
1840	425	83,787
1850	559	174,455
1860	662	209,036
1870	916	287,989
1880	2,156	1,200,904
1890	2,122	2,190,442
1900	2,013	3,552,636
1902	2,038	3,959,352

The claim that South Australians as a people are frugal is supported by this record of the Savings Bank:—

	Number of Depositors.	Amount Deposited. £	Average Credit per Depositor. £ s. d.
1848 ...	214	£6,473	24 16 7
1850 ...	672	10,255	17 3 5
1860 ...	2,567	52,293	34 12 6
1870 ...	12,569	203,620	33 13 8
1880 ...	34,287	604,637	30 4 10
1890 ...	69,193	1,054,351	27 15 11
1900 ...	106,122	1,832,369	32 17 6
1902 ...	116,436	1,985,689	34 2 8

The reserve fund of the "people's bank" rose from £8 in 1848 to £25,000 in 1870, and £131,000 in 1902. The total funds of the Savings Bank stood at £5,414 in 1848; £448,658 in 1870; £3,631,537 in 1900, and £4,147,178 in 1902.

In 1870 183,797 persons in S.A. had on deposit in various banks—other than the Savings Bank—£1,196,678. This represents £6/10/2 per inhabitant. In the periods named the comparison was as follows:—

	Amount of Deposit in Banks. £	Average per Inhabitant £
1880	4,265,274	15 18 9
1890	7,198,636	26 2 6
1900	5,778,325	13 7 9
1902	5,926,114	16 7 6

The public debt of the State now stands at £27,272,545, representing £75/2/5 per inhabitant. It is necessary to bear in mind, however, that the greater portion of this outlay is represented by public works of a reproductive character such as railways £13,000,000, waterworks £4,500,000, telegraphs £1,003,236. Apart from public works earning interest the debt represents a deficiency to be made good by taxation of only £1/9/2 per head of the population—a small amount when compared with the services rendered.

The growth of the State educational system may be gathered from the following multiplication of public schools and the large increase of scholars:—

	State Schools.	Scholars.
1850	64	1,867
1860	210	9,843
1870	300	15,108
1880	370	36,277
1890	551	44,804
1900	690	62,439
1902	716	62,962

The Pastoral Industry.

The rise and progress of the pastoral industry in Australia constitute one of the finest records of expansion to be found in the history of any country. In less than a century from the introduction of the first sheep and cattle into New South Wales, the flocks of Australia numbered 124,000,000 sheep the herds aggregated 12,000,000 cattle, and there were 1,700,000 horses. Exports of wool have represented an annual value of as much as £24,300,000, and the total value of pastoral property in seven colonies was estimated in 1901 at £241,554,000. Exports of meat from four States have touched an annual value of £800,000. Towards these colossal totals South Australia has contributed for over sixty years. Since these high-water levels were touched, droughts in nearly all the States, a rapid expansion of the meat export business, shipments of horses for military purposes in South Africa and India have reduced the number of livestock in the Commonwealth. Even during the period of greatest depression, when everything seemed to combine to work destruction, the pastoral industry in South Australia, as in other States, has maintained an unchallenged position at the head of the export list. During sixty years of chequered history, yet steady expansion, the wool industry has contributed no less an amount than £59,000,000 to the staple exports of South Australia.

The history of pastoral expansion in these lands is the political, commercial, and social record of our island continent. They are so closely interwoven that it is difficult to distinguish their respective influences on one another. Australia owes more than it is possible to estimate to her shepherd kings, who were the pioneers of pioneers—the first to turn their backs on the coastline and face the unknown. Theirs was a strenuous life from the first. They went out into the wilderness and did their own exploring work, occupied and proved the country, then moved on to make room for the farmer and other rural producers. But for the flockmasters, the occupation of some portions of South Australia would have been greatly delayed. They carried their lives in their hands, lived hard and worked laboriously. Who shall calculate the influence of their courage and sturdy independence, their patience in the face of difficulties, their self-reliance and hopefulness, or attempt to measure the results which have directly sprung from their victories over the natural conditions of an unmapped country? The pastoralist was called upon to solve geographical mysteries, to deal with treacherous natives, and the great warrior who burned his boats was not more determined than were the pioneer woolgrowers and herdsmen who cut themselves adrift from civilization as they pushed their way into the heart of the continent. The blacks were troublesome in the early days, and flocks had to be carefully shepherded during the daytime and yarded and watched at night. One early squatter was so disgusted at the depredations of the natives and his inability to stop them, that he sold property for £300 which subsequently was leased for 30 years at an annual rent of £10,000! During a visit to a number of cattle stations in Central Australia and the Northern Territory as recently as 1891 I saw quite a number of cattle which had been speared by the blacks. One cow looked like a porcupine, and we took eleven spears out of the poor beast. The natives soon learn to appreciate the distinction between meum et tuum, and become very serviceable on outlying stations.

To appreciate the significance of the pioneer work done by the builders of this important industry is to comprehend at one glance the whole romance of colonization, as regards the development not only of South Australia, but Australia as a whole. Ever in the van the pastoralists have been the pathfinders who bridged the

Station Scene in the North—Starting out for the day's work.
S. J. Dailey photo.

ford and cleared the road, and made the country safe and pleasant for exploitation by merchant and mechanic and all that army of workers whose daily prosperity may be measured by the fluctuating prosperity of rural producers.

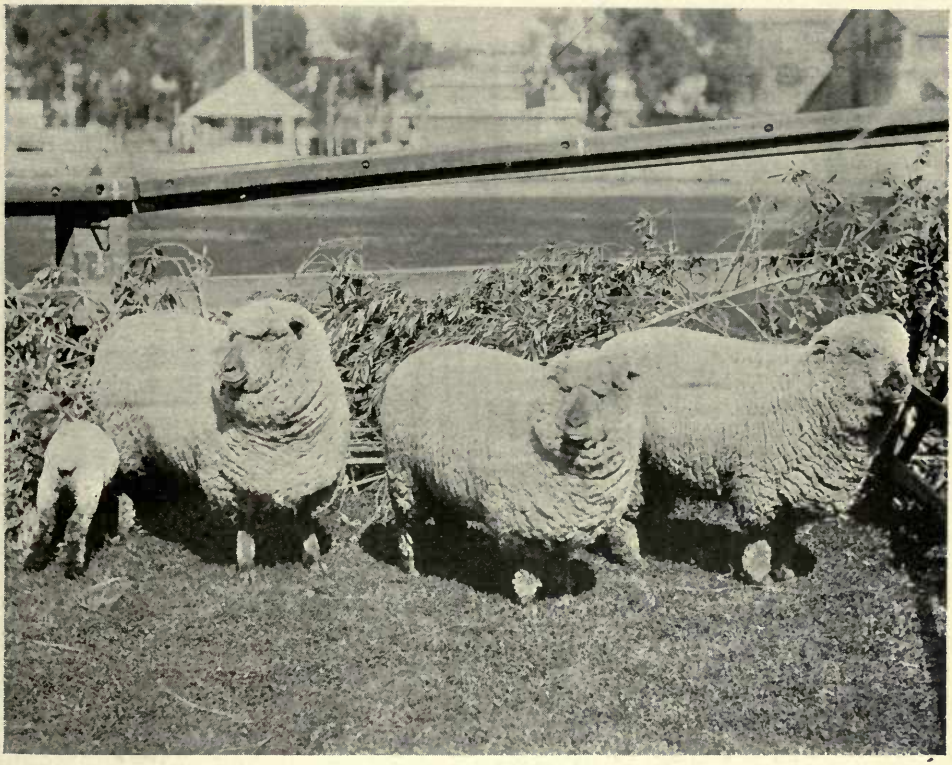
Fortune smiled from the first on those who were early in the field, and who by exchanging cash for lands within easy distance of the seaboard helped the infant province out of pressing financial difficulties and laid the foundations of their own fortunes. Sheepfarming within what is termed the "rainfall line" was a profitable business from the outset, and, although these producers have at times suffered from low prices and bad seasons, their lot has been cast in pleasant places compared with that of Crown tenants in remote localities. Whilst the inside man has enjoyed almost uninterrupted prosperity, the "out-back" pioneers have had many ups and downs. Although practically "monarchs" of all they surveyed, living a life of great freedom in one of the healthiest climates in the world, their surroundings have often been comfortless and uninviting. They were not a feather-bed race, and attached little or no value to the luxuries of cities. They lived a nomadic life, pitching their tents at sunset, and by sunrise were extending the circle of colonization. The outermost station was always the starting point or the city of refuge for the daring explorer.

Neither "baronial" nor any other castles are to be seen on the great sheep and cattle stations of interior South Australia. Two rooms of slab and mud, roofed with broom or ti-tree. An old case for a table, smaller ones in place of chairs. For beds, the floor, with a saddle as a pillow, a rug or blue blanket for covering. Menu for breakfast: mutton and damper. Ditto

for dinner and tea, with a few Johnny cakes as a rare luxury. Tea is the standing beverage—newly-made billy-tea—a most refreshing stimulant. A rifle or two and some old-fashioned guns hang on the walls, which are well plastered with cartoons from the comic press, colored pictures from Christmas numbers of the weekly papers, and representations of racehorses. A few fly-speckled, broken-edged photographs dispute the ownership of the only mantelpiece with short-stemmed clay pipes and jars containing tobacco. There is a blackfellows' camp a few hundred yards down the hill from "Government House" (as the head-station hut is called), and close up are the drafting yards. It is from some such centre as this—typical of the out-back station-manager's residence—that runs carrying vast flocks or herds, as the case may be, are controlled. Very often the owner or the manager and his men are absent from the head station for weeks at a time. Then they live in the open: the earth for a mattress, the blue sky for a roof.

This description applies to life out back—a life that is free and healthy and has great advantages. In the more settled parts of the State there are many handsome houses and fine estates, and station life as there represented has countless attractions. So mild and healthy is the climate of South Australia that man and beast require practically no protection against the weather. This is a most important point for would-be settlers to remember in weighing the advantages of Australia against other countries as a field for their enterprise. The fact that neither sheep nor cattle are ever housed, and no artificial feeding of stock is required, enables a great saving to be made in the cost of production, and partly explains the rapid expansion of the pastoral industry.

In the early days the pastoralist paved the way. He did more. He tested the country in a variety of ways, sometimes perishing in his attempt to occupy territory which even his pertinacity could not subdue. It was the pioneer stockman who first proved that the climate and soil were admirably adapted for the raising of live-stock, and that certain localities were favorable for growing cereals; while several of our most valuable mineral deposits were discovered by shepherds and boundary riders. He did all this in face of many dangers and difficulties. Whilst the white settlers at times dealt out justice in a rough and ready manner, the blacks often took vengeance by murdering shepherds and putting firesticks to grass or huts. The greatest source of anxiety and expense against which the grower of the "golden fleece" has had to contend—excepting, of course, the rainless seasons—have been wild dogs and rabbits. Vermin have proved an endless source of worry, hundreds of thousands of pounds having been spent in carrying on a relentless warfare against the dingo and the rodent. From the shepherding in the early days—when the flock was guarded by day and yarded at sundown—the evolution has been sheep-proof fences of five or six wires, to wire-netting barriers of various types, topped with barbed wire, in order to check the movements of both stock and vermin. The system is a costly one, but experience has shown that it is the only way of profitably occupying our outside country. Main lines of vermin-proof fences are now erected at the expense of the lessee, assisted by the Government, in various parts of the State. This tract of country is then divided and subdivided until each lessee is able to cope with his natural enemies within his own boundaries. It was a long time before fencing was substituted for shepherding. The old squatter was prejudiced against fencing, but the advantages of it eventually appealed to him. The modern tendency is towards reducing the size of the paddocks, which saves the sheep the necessity of travelling long distances for water and facilitates the preservation of the grass and bushes.



Shropshire Ewe and Progeny, the property of Sir S. J. Way, Bart., Kadlunga.

Flocks and Fleeces.

The foundation of sheep-breeding and wool-growing in this State was laid by the South Australian Company importing Merinos from Tasmania and New South Wales; also rams from Mecklenberg. The first fleet which sailed for South Australia had on board some Leicester and South-down sheep, and purchases were also made at the Cape of Good Hope, where sheep were then selling at 5/ each. From the very beginning of settlement in this State the value of the squatting industry has been recognised, and South Australians have every reason to be proud of the success achieved in the various enterprises for the rearing of sheep and the production of wool. "The South Australian Company had purchased," says "The Register," in its first number, published in June, 1836, "a very fine lot of rams and ewes of the finest and purest breed of Merinos, which were selected with great care and at much expense in Saxony, by the son of a great sheepholder of Van Dieman's Land for his own stock. They also sent out in their different vessels a supply of pure Leicesters and Southdowns, and ordered the ship Emma to call at Capetown and procure other sheep for mutton and for crossing purposes." The policy pursued by the Company had the vigorous support of Colonel Torrens, the Chairman of the Board of Commissioners, who, in speaking on the wool staple of Australia, said that "as the population sweeps over the vast regions of America from the Atlantic to the Pacific, and as the freetrade in China opens to British enterprise, hundreds of millions of additional consumers, the natural, the necessary conclusion seems to be that for generations to come the still increasing demand for Australian wool

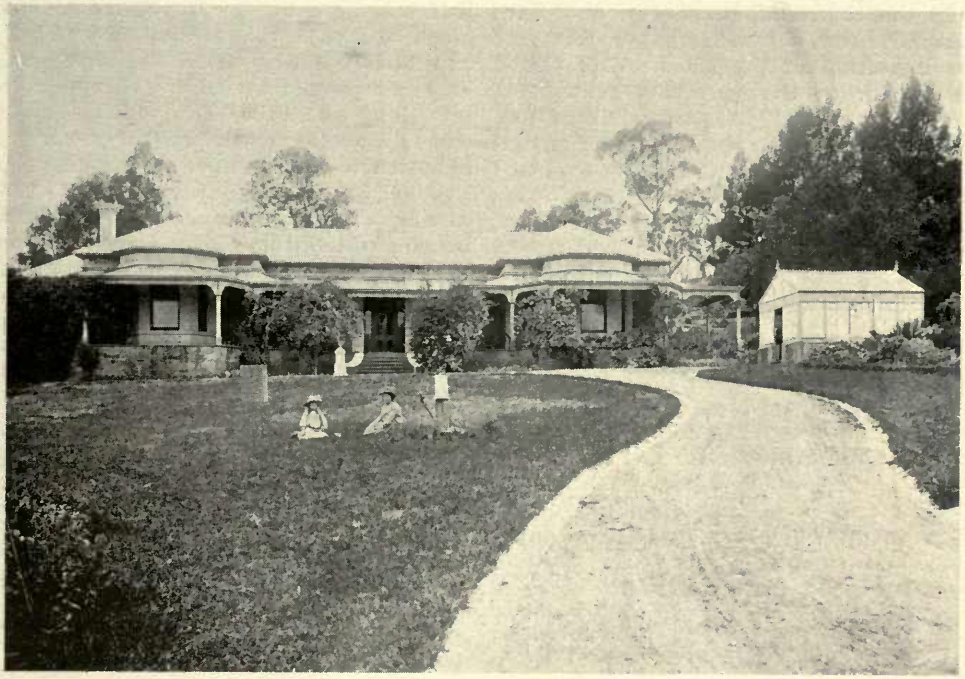
will be in advance of the constantly augmenting supply; and that the value of this important staple will maintain an elevation sufficient to secure to the British nations growing up in New Holland a degree of prosperity hitherto unexampled in newly settled countries." Heavy losses occurred on the voyage from Tasmania, and the overland journeys from Sydney proved expensive and dangerous. Notwithstanding such drawbacks, however, the South Australian Company and private individuals continued to make importations, so that within two years of the proclamation of the colony the flocks numbered 28,000. By the end of 1841 the Company owned 20,000 sheep, and Messrs. Dutton and Bagot, Mr. Duncan MacFarlane, and Mr. G. A. Anstey about 10,000 each. In December, 1837, Messrs. Hallett & Duff shipped four bales of wool at Port Adelaide for London by the Orator. This was the first clip from a South Australian flock. A month later a joint stock sheep company was formed in the colony with a capital of £20,000, and in a very short time the shares were all taken up and the company was in possession of a flock of 600 maiden ewes and 300 wethers. From this time onwards there was a rapid increase, so that by 1851 there were over 1,000,000 sheep, early in the sixties over 3,000,000, in the seventies over 6,000,000, the eighties 7,000,000, whilst in 1891 the high-water mark was reached, when the flocks aggregated 7,745,541. The decline which has since taken place is attributed to large resumptions of pastoral country by the Government for the purpose of cutting it up for agricultural requirements, the recurrence of droughts, and low prices. The following shows the decennial increase of the flocks since 1841:—

Five Years ending	No. of Sheep	Value of Wool Exported.
1840	200,160	£8,740
1845	480,699	72,235
1850	984,199	131,731
1855	1,768,724	283,419
1860	2,824,811	573,977
1865	3,779,307	821,656
1870	4,400,655	902,696
1875	6,179,395	1,833,519
1880	6,453,222	1,716,171
1885	6,696,406	1,417,245
1890	7,004,642	1,353,762
1896	6,233,993	1,228,991
1900	5,667,283	1,003,391
1902	5,012,216	1,222,403

According to Coghlan ("The Seven Colonies of Australasia, 1901-2"), the weight of wool per sheep has been increasing regularly in each of the States, and that authority says:—"In South Australia the weight of wool per sheep has been consistently higher than in the other States," and the following table supports that view:—

State.	1861. lb	1871. lb	1881 lb.	1891. lb.	1901. lb.
South Australia	4.69	6.41	6.93	6.85	7.9
New South Wales	3.28	4.57	4.47	5.74	7.2
Victoria	4.52	6.17	6.87	5.68	6.9
Queensland	3.40	4.73	4.50	4.73	7.1
New Zealand	3.48	4.76	5.32	6.42	8.1

This increase in the weight of fleece per sheep is what growers in this State have been consistently aiming at for years, and it is the pride of our stud-breeders that they are able to produce rams and ewes which will give these results. That growers in other States, also in New Zealand and South Africa, recognise this quality in South Australian stud sheep is proved by the heavy drafts they make on our flocks each year. Our sheep are singularly free from disease, and practically the only trouble is tick, which is kept under by dipping at shearing time. It is quite a mistaken idea that the area adapted for raising sheep in South Australia is limited, and that we can look for no great expansion in the future. Given a return of fair seasons, the multiplication of facilities such as water supplies in the interior, additional railways (like those projected, north and west), and there is every reason to expect that the unoccupied lands will be gradually taken up and stocked. There is a class of people whose very nature drives them into a pessimistic



S. J. Dailey photo. *The Homestead, Mt. Crawford Stud Station.*

view of everything. Their chief delight is to pick out defects and unduly magnify them. Of late there have been some critics who have declared that Australia has reached the limit of its wool-producing powers, and that henceforth this industry must decline; that the quality year by year is becoming weaker, and that the trend of future markets is against the expansion of the wool trade. It was said a few years ago that wool-growers in New South Wales had more cause to deplore than to rejoice in the increase in their flocks; that they must face the unpalatable facts that there are far too many sheep in the country; that the country itself is sheepsick; that all the best saline grasses are eaten away; that, although in many districts there is an abundance of feed, it is sour and so poor that it generates worms and produces inferior wool! If this were true of one State it by no means applies to Australia as a whole. As a matter of fact, it is criticism born of ignorance. Surely it is sufficient refutation of the charge that the Australian sheep is deteriorating to point out that the wool clip shows an increasingly heavier yield per sheep, thus proving that the flocks per head have become more productive. It is now recognised that the way out of the difficulties which beset the pastoralist is by advancing the industry to a higher level—that it must be conducted not merely with greater economy, but with the exercise of more brain power than was formerly, as a rule, required, and that at the disposal of this brain power must be larger capital than was once considered necessary. Economically managed there are millions of acres in South Australia which are capable of profitable occupation. Water conservation and additional transit facilities will one day cause these idle lands to be made highly productive. "Taking all circumstances into consideration," says Mr. Coghlan, the statistician, "it may be fairly estimated that under the present system the States are capable of maintaining, in ordinary seasons, stock equivalent to 390,000,000 sheep — that is, about 180,000,000 sheep, or their equivalent in cattle, more than are now depastured."

In the course of an address on "Our Pastoral Interest," delivered in 1896, at the invitation of the Chamber of Commerce, Mr. A. G. Downer, a gentleman largely interested in pastoral pursuits, said:—"Let me now dwell on some of the benefits that will flow from development. Of the 318,000 square miles outside of counties there are probably 200,000 that can be profitably used by development. Of this 200,000 miles, 100,000 will admit of an expenditure of £50 a mile, or of £5,000,000, while the remaining 100,000 square miles will probably profitably admit of an outlay of £2,500,000, being the minimum amount which it seems to me is necessary for development. This will probably mean an ultimate increase to our flocks of 20,000,000. Every million of sheep means permanent employment for something like 500 regular hands on a station. By regular hands bear in mind that I mean merely the hands engaged throughout the year in working the station—not the hands employed in developing, not the hands employed in shearing, not the hands employed in the carriage of stores, wool, &c. Quite apart from the regular hands, it will mean expenditure in the mere cost of and incidental to shearing, wool-pressing, and the carriage of wool to its shipping port, and this will be from £2 to £4 per hundred sheep. Taking, therefore, the mean of £3, this involves the annual expenditure of no less than £600,000 on 20,000,000 of sheep. Let me say that, large as the sum of £4 may seem, it is under the actual cost which is entailed on one station under 300 miles from Port Augusta. In a letter published by Mr. Peter Waite in both our leading papers on March 21 last, Mr. Waite shows an expenditure for the year ending January 31, 1893, of the Beltana Pastoral Company's properties a sum of £63,839/3/8. Of this amount about £15,000 was paid to contractors for well-sinking, dam-sinking, artesian boring, building, &c., which may be called an expenditure on capital account. Nearly all the rest of the £63,000 is what may be considered as fair annual expenditure on the run; about £18,000 of this went to the Government for rent and carriage. The run carries about 350,000 sheep and about 26,000 head of cattle—equal say to half a million of sheep. It is not too much to say, therefore, that on this basis expenditure every million of sheep will mean an average annual of expenditure of something like £100,000 a year. In this expenditure there will probably be a contribution to the revenue of something like £20,000 to £30,000 a year for rents and carriage, to say nothing of the indirect benefits will will flow to the revenue from Customs duties." In a report to Parliament the then Surveyor-General, the late Mr. Goyder, said:—"I will submit the following figures, which are (obtained from actual experience) found necessary to develop an area of 1,600 square miles on the Mutooroo Run. As a preliminary expenditure borings were sunk to various depths and in all parts of the run, but salt water only was obtained. The idea of developing the country by means of wells had, therefore, to be abandoned, and no notice has been taken of the expenditure on account of borings or well-sinkings. The first step taken to secure surface waters was, after careful inspection of the fall of the country and depressions by which flood waters reached the lower levels, sites of small dams or reservoirs were agreed upon and sunk. When these were filled larger reservoirs were sunk from these as a basis, until what appeared to be a sufficient supply had been secured; but these were found to be too shallow, as in a year of drought they became dry, and all had to be deepened not only to supply the stock for (say) two years, but also to provide for evaporation, which in the Far North, North-West, and North-East is from six feet to seven feet per annum. The depth of these large reservoirs was calculated not only to supply water to stock depasturing the land within (say) five miles of the reservoir, but also to stand evaporation amounting to a vertical height of from ten feet to fourteen feet of water. This was done at a total cost for dams and drains of nearly £30,000, and, water having been secured, the run was fenced and other improvements made at a cost of about £18,000, making a total expenditure of £48,000, to which may be added £600 for the destruction of vermin, about 400,000 rabbits being destroyed by means of poisoned twigs of sandalwood scattered about the

various waters, the bodies being afterwards collected and carted away. This expenditure, without cost of management, comes to £48,600, or over £29 per square mile. The country will carry an average quantity of stock equal to forty sheep per square mile, and, assuming that these can be placed on the run at 8/ per head, the total cost of improvements and stock comes to £74,265, which at 5 per cent. per annum comes to £3,713 interest, which must be met before profits can be considered. Now 65,400 sheep will yield in the country referred to 371,325 lb. of wool, which at 6d. per lb. net is worth £9,288, or £5,575 over the interest of amount expended on account of improvements and destroying vermin; and allowing £1,500 for management, horses, drays, plant, and contingencies, a balance of £4,075 is left to the lessee, or a profit of 5½ per cent. on his undertaking over the 5 per cent. previously referred to, requiring several years' hard work, the anxiety of bad seasons, the death in stock, &c., &c.—and this is assuming that by his expenditure he has guarded himself against losses contingent upon dry seasons and against the inroad of vermin—in other words, he receives on his capital and expenditure a little over 10 per cent. Should the area of the lease be small and the expenditure in proportion—for 1,000 square miles and a capital of £45,226/16/8, he would receive £4,250 per annum; on 500 square miles, with a capital of £22,610/8/4, he would receive £2,260; on 250 square miles with a capital of £11,305 he would receive £1,130; and with 100 square miles and a capital of £4,522, he would receive £452 net as profit, provided the country carried an average of 40 sheep per square mile and yielded five pounds of wool per fleece realising a net profit of 6d. per lb."

It is a truism that the misfortunes which at the time seem hardest to bear are often blessings in disguise. So long as the squatter could carry on in a happy-go-lucky way, and yet make an ample income, it was not to be expected that he would turn his thoughts to the frozen meat trade, to water conservation on a large scale, to artesian boring, and to many other more or less important matters which now occupy his attention. But we have reached the period when the careless producer must go to the wall. Gradually his place is being taken by the pastoralist always on the look-out for improved methods of conducting his industry, who knows that he can only thrive by using his head as well as by undergoing physical privations. Perhaps there is something to be regretted in the change. The old time squatter was often a rough diamond, but he was racy of the Australian soil, and not devoid of a certain picturesqueness. The modern pastoralist—the change of designation is of itself significant—has to be a smart man of business. He must be better educated and see further ahead than his predecessors had to look. In short, the pastoral industry is more and more assuming a new character. Principles of the modern counting-house and the banking chamber are driving out the poetry. This was in any case inevitable as the States grew older and were more settled, but the necessity of the present position will give the movement a marked impetus. It cannot be doubted that the new responsibilities devolving upon the pastoral lessee entail new responsibilities upon his landlord. If the day of the squatter has gone, so have the times of bitter antagonism between the pastoral tenant and the selector. After much beating about the bush it has been discovered that there is room enough in South Australia for both the pastoralist and the agriculturist, and that there is work enough for both to do without worrying each other by a policy of pinpricks. After many years of negotiations land laws have been adopted which the lessee regards with more favor, whilst more elasticity has been introduced into the methods of administration. To the capitalist in search of fields of investment, the pastoral industry in South Australia is one which provides scope for capital and opportunity for energy and business acumen.

Stud Flocks of South Australia.

The breeding of stud sheep has proved a profitable business in this State. Certainly it is one of the most interesting occupations engaging the attention of some of the best and brainiest men in South Australia. In this connection such names as Angas, Murray, Browne, and Hawker naturally suggest themselves. These men and their sons have laid the foundations of an industry, the growth of which is practically unlimited. The first sheep introduced into Australia were imported into New South Wales about 1788. Although not the first importer of sheep, Captain Macarthur was the pioneer flockmaster of Australia, and from his stud sprang most of the great flocks which have made Australia famous throughout the world as the home of the profitable all-round Merino. During recent years various types of mutton breeds have found favor in South Australia. Shropshire, Lincoln, Southdown, and Dorset Horn studs now exercise an important influence on the rapidly expanding lamb export trade, and no review of stud sheep breeding would be complete that omitted a reference to them.

Dealing first with the Merino, it is a singular fact that the stud breeding has been in the hands of exceptional men—men who combined stern unbending determination with rare perception and sagacity. According to Darwin, not one man in a thousand has accuracy of eye and judgment sufficient to become an eminent breeder. The Merino flockmasters of South Australia possessed these qualifications to a remarkable degree. More than that, they had faith in themselves and a clear intelligent conception of the type of sheep they desired to produce. At different periods when leading Australian breeders were blown hither and thither like thistle-down in a breeze by a popular fancy for some new breed, the majority of South Australians paid no heed to the voice of the siren of fashion. They kept steadily onward, some of them, like the late Mr. John Murray, founder of the celebrated Murray Merinos, practising the delicate and intricate art of in-and-in-breeding—others building up from without, but with the one goal in view. The result is that there is a fairly uniform type of Merino in South Australia—a high-class animal remarkable for constitution, carrying a heavy fleece, long and strong in staple, and commanding top market prices. A Russian expert who recently inspected many of the leading flocks of Australia spontaneously declares that the "South Australian stud Merino sheep are the best in the Commonwealth." It has been my privilege to inspect most of the stud flocks in this State, and opportunities were afforded me at various times of studying the methods of leading breeders and noting the results obtained. The impression has been strongly conveyed to me that our flockmasters work along scientific lines, displaying remarkable consistency and determination. An animal is being produced in South Australia which is eagerly sought after by sheepfarmers and pastoralists throughout Australia and South Africa, whose aim is to increase the average yield of wool of their flocks. Breeders in Argentine have not yet discovered the South Australian Merino, or they would hardly have failed to obtain a type of sheep which for constitution and character of wool is just what is required to improve the flocks of South America. Efforts have been made to induce breeders here to make a trial shipment of rams to Buenos Ayres, but the demand for regular drafts from all parts of the Commonwealth, New Zealand, and Southern Africa has prevented the experiment being made. A typical South Australian bred Merino is an animal of large symmetrical frame and robust constitution, carrying a heavy fleece, of long staple, strong in character, possessing lustre and softness. Artificial feeding is never on any consideration resorted to on the Merino stud farms of this State. The law of the "survival of the fittest" is allowed to work in its own relentless way. The weaklings are not spared by pampering methods.

The stud flockmasters are sometimes envied by agriculturists, who cast covetous eyes upon the beautiful estates devoted to

Smith photo. *Valuing Wool at a Port Adelaide Wool Store.*

Shearing Sheep by Machinery, compressed air system, at Wellington Lodge Station.
S. J. Dailey photo.

Station Scene in the South-East.

sheep-raising. In this connection it is well to recall the fact that but for the studbreeder many a farmer in South Australia would be robbed of an important item of income, for since the starting of farmers' flocks, and particularly in connection with lamb-breeding for export, the small grower is dependent upon the studbreeder for supplies of new blood to maintain the standard of quality.

During recent years considerable attention has been devoted to improving mutton qualities. To this end the Shropshire breed of sheep was introduced in 1888 by His Excellency the Lieutenant-Governor, Sir Samuel Way, who has ever been a practical friend to the agricultural interests of this State. He acted on the advice of his manager, Mr. F. H. Weston, who confidently predicted that the Shropshire would thrive well in Australia, producing a good fleece of wool and providing a splendid crossing strain for mutton purposes. That judgment has been abundantly justified by results. The ten ewes and ram imported by Sir Samuel Way and placed on his Kadlunga Estate thrived so well that success was early assured; and other enterprising men quickly recognised the profitable qualities of the breed. The introduction of the Shropshire had a wonderful influence on the lamb export trade, then attracting attention, and experiments proved that the Shropshire crossed with Merino produced an early maturing lamb of excellent quality, well suited for British markets. Within a few years of the first importation there were quite a number of studs, and a Shropshire Sheep-breeders' Association was formed, the members of which had two objects in view—(1) To breed stud rams and ewes, and (2) to breed rams for crossing purposes. The production of mutton breeds of sheep such as the Shropshire, Lincoln, Dorset Horn, and Southdown has become an important industry in South Australia. With the steady growth of the meat export business flockmasters find no difficulty in disposing of their annual drafts to farmers, who are beginning to realise the importance of introducing fresh blood into their small flocks at frequent intervals. A feature of the Shropshire breed is its wonderful adaptability. These sheep thrive equally well in the dry climate of our Northern districts and in the cold and wet portions of the South-East. They are remarkable "doers," and have exercised a great influence in the promotion of the lamb export trade.

Dorset Horn sheep, imported in 1895 by Mr. John Melrose, of Ulooloo, have also proved their worth. The inauguration of the lamb export trade induced Mr. Melrose to experiment with the Dorset Horn owing to their early maturing qualities, and he has had no reason to regret his action. Up to the present time they have well maintained their English reputation. The Dorset Horns are hardy and well able to develop and keep in condition on our ordinary indigenous herbage; they are exceedingly prolific, twins being frequent, and three lambs not uncommon. In 1901 Mr. Melrose reared 47 lambs from 34 ewes without any loss of condition on the part of the mothers. They are large-framed sheep, with well-developed bodies and limbs. The flesh is of good quality, and free from tallowy flavor, characteristic of the Lincolns and Leicesters. Their weak point lies in their fleece, which is generally very light. It is a question, too, whether their heavy horns might not with advantage be dispensed with. Nobody supposes that any English breed of sheep will ever supplant the Merino in Australia. Nevertheless in the rearing of early maturing lambs their aid is indispensable. Which breed will be chosen will perhaps be decided by local conditions, or even by personal predictions. The Dorset Horn, the Lincoln, the Shropshire, and even the Southdown, all have their special adherents. Some even favor complex crosses of several of the breeds with Merinos. It does not at present seem probable that any one breed is likely to be adopted to the exclusion of all others.

The special qualities of the Lincoln and Southdowns have not been overlooked, and splendid types of these sheep are reared by different breeders.

"Droving."

Now this is the law of the Overland, that all in the West obey:
A man must cover with travelling sheep a six-mile stage a day;
But this is the law which the drovers make, right easily understood,
They travel their stage where the grass is bad, but they camp where the grass is good.
—PATTERSON

The Murray Merino Studs.

Sixty years ago the late Mr. John Murray laid the foundation of the Murray Bros.' celebrated Merino stud flocks, which are known throughout Australasia for their magnificent constitutions and highly profitable qualities. The history of sheep-breeding in Australia provides many striking examples of patient, determined work, over a series of years, to attain some desired result, but it would be difficult to find anything to equal the consistent labor of Mr. John Murray, and the undaunted fortitude displayed by him in achieving such wonderful results as a breeder of high-class Merinos. The founder of these flocks possessed a resolute will, and had a remarkably clear and intelligent conception of the type of sheep he desired to produce. Mr. Murray throughout the period of his work of construction proceeded on well-defined lines. He had faith in himself and in his plans, and believed in the old adage that "they can conquer who know they can." He knew exactly what he wanted, and went quietly and resolutely to work to attain the object constantly kept in view. Criticism might be passed upon the results of his labors, and good advice given or praise bestowed upon his success, it had little or no influence one way or the other. He was critic-proof and praise-proof, and the type of his flock was not interfered with by every passing fancy of the moment. The work he began has been continued by his sons, and the Murray studs to-day occupy a unique position amongst the Merino flocks of Australasia. Mr. Murray practised from the outset the delicate and intricate art of in-and-in-breeding, and this is being continued. There has only been one foundation in the creation of the flocks which exercise a great influence throughout Australasia at the present time. They have been inbred for 60 years, no other blood having been introduced into the flocks since the first purchase of a ram and a few ewes. This of itself gives to the Murray Merinos an importance which is not shared by any other flock in South Australia. Apart from that, it is well known that the influence of these sheep, for many years past, has been very considerable, not only in this State, but throughout the Commonwealth and in New Zealand and South Africa. Then, the high prices paid for the Murray sheep at public and private sales, and their phenomenal success at the Royal Show in Adelaide, year after year, attaches to them a very wide interest. For 20 consecutive years the champion prize for Merinos at the Royal Show, Adelaide, fell to the Murray sheep. Their show record is a wonderful one. A famous ram, "Trophy," won the Old Colonists' Plate, valued at 150 guineas. "Prince Imperial" had a fine record. He took the champion prize in two successive years, serving 100 ewes each season, and his fleece took first prize as well. When three years old his fleece weighed 18 lb. 12 oz., and his live weight was 205 lb. Murray sheep have taken numerous prizes in New Zealand and Western Australia when exhibited by purchasers, and the wool has gained high honors at exhibitions in London and Philadelphia.

It was early in the forties that the late Mr. John Murray laid the foundation of a stud Merino flock by purchases of high type Merino rams and ewes. That the original sheep were high-class is shown by the fact that a ram bred the year after Mr. Murray had formed his flock took champion prize at the Adelaide Show, although imported rams were placed against it. This feat rather put South Australian flockmasters on their mettle, and several fresh importations were made, but Mr. Murray's ram took the championship for six consecutive years. Mr. Murray applied the science of in-and-in-breeding with consummate skill, gradually increasing the density and quality of the fleece and the size of the carcase. His motto was (1) constitution, (2) constitution, and again constitution. The pronounced type of the sheep he bred soon brought them into repute, and a very strong demand for sires from this flock sprang up from various parts of Australia. New South Wales, Victoria, Queensland, New Zealand, Western Australian, South Australian, and

South African squatters have been extensive buyers, and their reports in praise of the results obtained by using the Murray Merino rams would fill several volumes. From the outset the Murray sheep have cut heavy fleeces of bold, robust, profitable wool. The Judges' remarks at the Sydney Show, 1873, were:—"Mr. Murray's wool is a remarkable combination of softness and strength; a bright, lustrous wool, exceedingly clean." An expert in South Africa, after carefully examining some Murray sheep imported there, officially gave a most favorable report on the sheep and the splendid quality of the wool they carried. Equally satisfactory reports were received from London and Philadelphia when fleeces were exhibited there. The founder of the flock would never under any consideration artificially feed or house his sheep. He believed in the doctrine of the "survival of the fittest," and an animal which did not do well under natural conditions and justify his or her presence in the flock paid the penalty. In discussing the principles that guided him, the late Mr. John Murray once said:—"I take great care to breed from rams of strong constitution, with as much quality, length of staple, softness, and lustre as possible, with ample yolk, but never lose sight of great weight of wool." This policy is observed by the present owners. They cull with a severely critical eye and a judgment which reflects the genius possessed by their honored father of knowing exactly what a sheep will develop into. The 2-tooth must give promise of something good or out he goes. No Murray sheep has ever been artificially fed, housed, or otherwise pampered. "Utility" is the object steadily kept in view, the idea being to breed an animal which will produce good results in any part of Australia. It is because these sheep are not unnaturally developed and artificially prepared that they are not sent to compete in the show yards of the other States. If artificially fed, some of the prize-takers which have been seen at the Royal Shows in Adelaide would fill out to a wonderful size, and with their robust constitutions, grand fleeces, and generally aristocratic carriage, would take a lot of beating in any sheep show in Australasia. But the Messrs. Murray have no desire to depart from their policy by artificially improving their sheep in order to compete on equal terms with breeders elsewhere. This would be "pampering," to their mind, and that is what they have never done, even to the slightest extent. It is because of their natural robustness and this rigorous bringing up that the sheep have done so remarkably well when exposed to the severe natural conditions of some parts of Australia and South Africa.

The Murray type of Merino is an animal of large symmetrical frame, healthy and vigorous constitution, clean skin, silky face, carrying a fleece of great weight, long staple, ample yolk, good density, not too fine in quality, but uniform in quality all over the body, well-covered, with even, soft, lustrous wool of elastic character.

On the death of Mr. John Murray in 1886, the original flock was equally divided between his four sons. Mr. John Murray became owner of the Rhine Park Estate and a fourth of the flock; Mr. T. Hope Murray, Mount Beevor; Mr. Alick. J. Murray, Mount Crawford; and Mr. W. A. Murray, Cappeedee. In January, 1902, in accordance with the will of the late W. A. Murray, the Cappeedee stud sheep were equally divided amongst the three brothers, T. Hope Murray taking his share to Mount Beevor, Alick J. Murray his to Mount Crawford, whilst John Murray, of Rhine Park, left his share at Cappeedee, and also purchased the remainder of the Cappeedee flock from the Executors of the late W. A. Murray. Mr. John Murray is now carrying on the balance of the Cappeedee flock as well as continuing his stud at Rhine Park.

The first Murray Merinos were taken to Melbourne for Exhibition by the late Mr. A. B. Murray over fifty years ago. The consignment consisted of three ewe hoggets, and they gained second prize. They suffered so much on account of the hardship of the voyage that the experiment was never repeated.

The following letter (abridged) was recently published in the Sydney "Stock and Station Journal":—"Sir—I am a firm believer in the Murray type of Merino as a thoroughly good paying wool and mutton-producing sheep, and introduced the strain

into the flock on this estate six years ago with the most satisfactory results. The Murray sheep produce a long stapled, bold, bright, shafty wool, carrying plenty of character, and, while not burdened with any excess of yoke, carry quite enough to ensure a beautifully soft handling wool. The sheep themselves have magnificent frames, and are noted for their strong and robust constitutions. I have been breeding graded flock rams from pure-blood Merino sires since introducing the strain here, and the best of these cut from 18 to 22 lb. of clean, bold wool, real bale fillers. Thirty-six bales of station-bred wethers' wool, containing Murray blood, made one shilling per lb. in the Sydney market last season.—Yours truly, E. A. RYRIE. Coolrington, Cooma, Nov. 16, 1903."

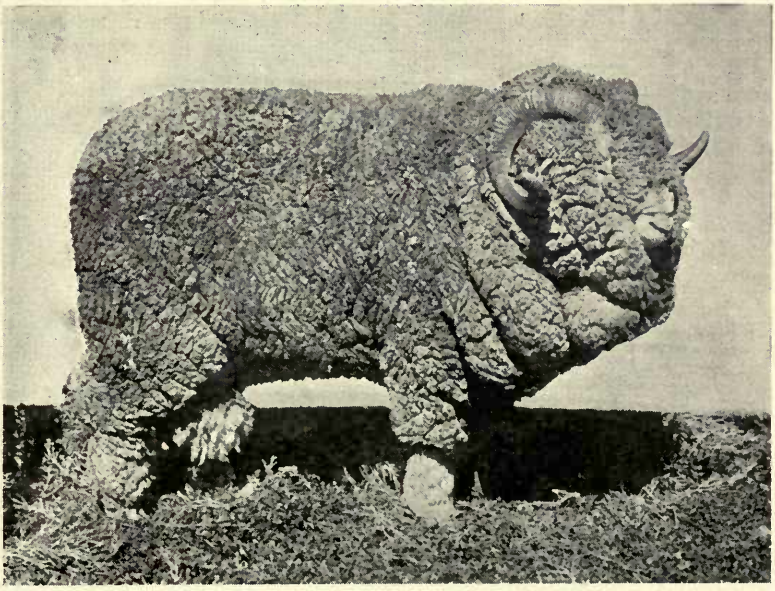
A View on the Rhine Park Estate, the property of John Murray.
S. G. Spink photo.

The Rhine Park Stud.

The Rhine Park stud, the property of Mr. John Murray, was formed by a carefully selected draft from the Mount Crawford flock. From the outset the flock was worked on precisely the same lines as those followed at Mount Crawford, and when, on the death of his father, the present owner came into possession he continued the same system. With the exception of exchanges with his brothers no outside blood has been introduced, and the Rhine Park sheep have won an enviable name for masculinity and all round high qualities. The illustrations are typical specimens of Rhine Park sheep. Portlight and Monarch are noted rams. On three occasions their fleeces have taken first prize at the Autumn Show of the Royal Agricultural Society after the sheep had taken first prizes in their classes at the Spring Show. Royal Duke, by Monarch out of a daugher of the champion ram, Wellington, took a first prize as a 2½-year-old, and was runner-up for champion in 1902. In 1903 he took first prize in his class, and was again runner-up. He cut, a few weeks afterwards, a fleece of beautiful wool which turned the scales at

"ROYAL DUKE" (by MONARCH).

FIRST PRIZE 1½ and under 2½ years, Adelaide, September, 1902. Cut the prize fleece, 20¼ lbs. FIRST PRIZE, over 2½ under 3½, September, 1903, and runner-up for Championship both years. Grazed at large on natural grasses only. Bred by and property of JOHN MURRAY, Rhine Park.

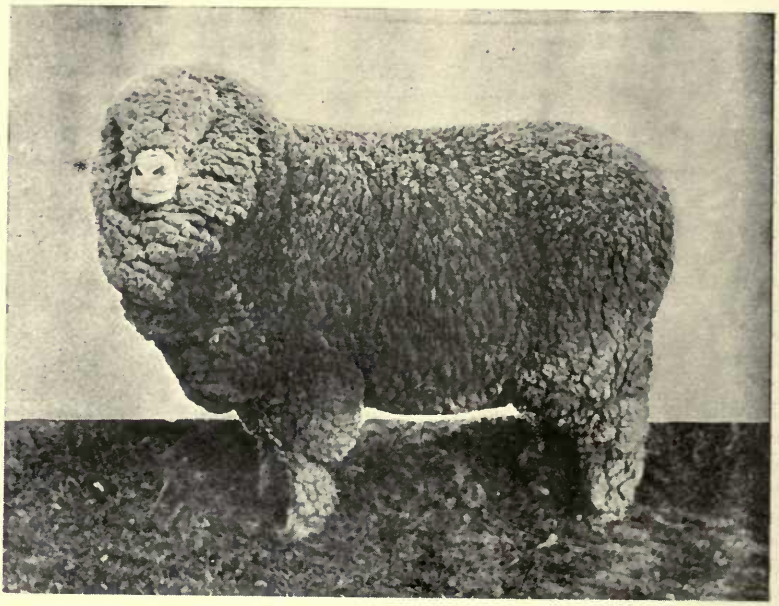


"PORTLIGHT" (by PORTSEA).

SECOND PRIZE under 1½ years, Adelaide, September, 1898. Cut a prize fleece, 19¼ lbs., March, 1899. THIRD PRIZE under 2½ years, Adelaide, September, 1899. Cut 23 lbs. 6 oz. FIRST PRIZE under 3½ years, Adelaide, 1900, and CHAMPION PRIZE. Cut 24 lbs., March, 1901. Grazed at large on natural grasses only. Bred by and the property of JOHN MURRAY, Rhine Park, S.A.

21 lb. Royal Duke runs back on the dam side to Wool Prince, a celebrated champion ram, and on the sire side to the champion John I., the two last champions bred by the founder of the flocks. A noted stud ram at Rhine Park at the present time is Wellington III., a grandson of the champion Wellington. Wellington III. cut 22 lb. of superior wool when 2½ years old; a prize fleece of 23 lb. when 3½ years old, and this season 27½ lb. of wool of great quality. A son of Portlight's cut 27 lb. in 1902, and 29 lb. at the 1903 shearing.

A fleece shorn from the Rhine Park champion ewe "The Queen" was sent to London a few years ago, and the following reports were received:—"We have examined the prize fleece with the greatest interest and may at once say that, of this class of wool, it is the most beautiful specimen we have ever seen. The growth is deep and sound, the staple clear at the root and evenly and compactly formed—a picture of vigor and strength. The fibre is of strong quality, especially towards the skirts, but it is not too coarse considering the great depth of the staple. The condition is light (about 55 per cent. yield) and the appearance bright and lus-



"THE QUEEN."

CHAMPION and FIRST PRIZE EWE, Adelaide, September, 1896. Cut Prize Fleeces, Adelaide, March, 1896-7-8. By CROMWELL (Prize Ram), by SIR JOHN (Prize Ram), by JOHN I. (Champion Ram). Bred by and the property of JOHN MURRAY, Rhine Park. Grazed at large on natural grasses only.

"MONARCH" (2½ years).

By CROMWELL II. (Prize Ram), by CROMWELL (Prize Ram), by SIR JOHN (Prize Ram), by JOHN I. (Champion Ram). FIRST under 1½ years, Adelaide, September, 1898. Cut Prize Fleeces, 18½ lbs., March, 1899. FIRST under 2½ years, Adelaide, September, 1899. Cut Prize Fleece, 20 lbs., March, 1900. SECOND under 3½ years, Adelaide, September, 1900. Cut Fleece 20 lbs. Grazed at large on natural grasses only. Bred by and property of JOHN MURRAY, Rhine Park, S.A.

trous. Such wool as this will always command attention, for, of its kind, it is a perfect article.—Helmuth Schwartz and Co." "We had the greatest pleasure in viewing this fleece, as we have never had such a perfect specimen under our notice before. Our report on same is that it is a marvellous fleece and perfect in its kind, good length, and remarkable even of staple, of good lustre, and of a yield of about 54 per cent. when the skirts and pieces have been removed. The quality though near 56/, the best quality of cross-breds, is all the same a desirable and useful one, and is at all times considered by the trade a favorable quality. The fleece is of immense size, and weighed close upon 18 lb., and it was a pleasure to look at it. It was examined by brokers, spinners, and manufacturers, both English and Continental.—H. Anders, manager Elder, Smith, and Co., Ltd., London."

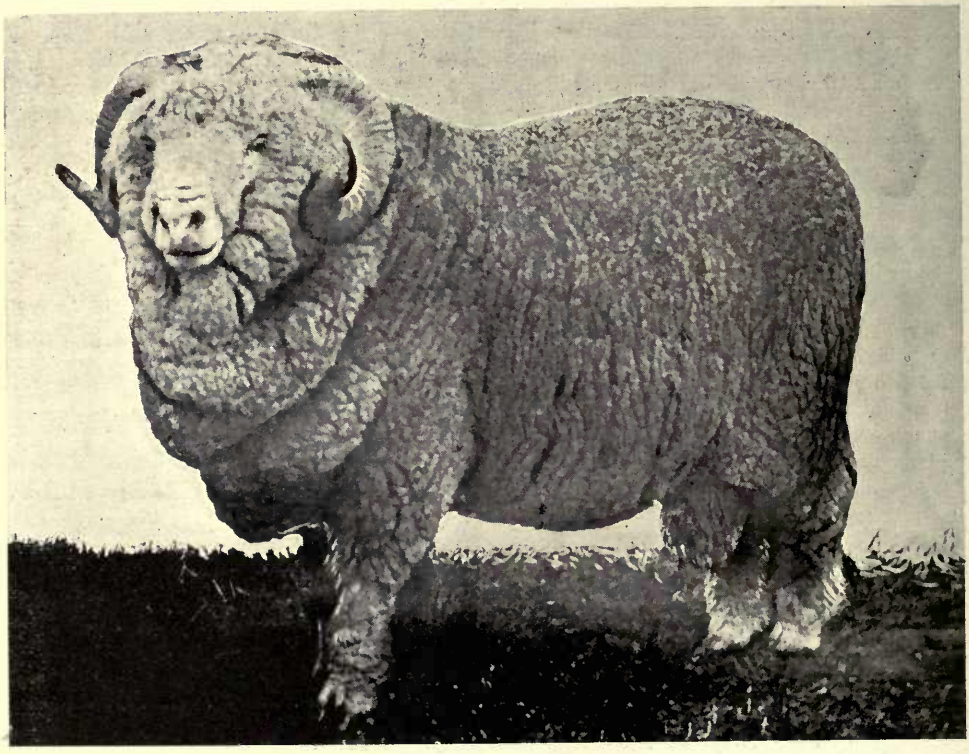
Rhine Park is situated near Eden Valley, 50 miles north-east of Adelaide, in a beautiful valley where the ridges run down from the highlands of the Barossa range to the great plain of the River Murray. The country has an attractive appearance, and the climate is favorable to the production of healthy stock.

The Mount Beevor Stud.

The Mount Beevor Estate, the property of Mr. T. Hope Murray, is situated in hilly country about 35 miles east of Adelaide, and seven miles north of the railway station at Nairne. The flock was drawn from the original stud at Mount Crawford, and two years ago a third of the Cappeedee flock was drafted to Mount Beevor. The country is eminently suited to the breeding of a strong type of sheep, which well maintain all the Murray Merino characteristics. A purchaser of Mount Beevor rams residing in New South Wales recently wrote to the "Stock and Station Journal," Sydney, publicly expressing a highly favorable opinion of the sheep. "The Mount Beevor

GROUP OF MOUNT BEEVOR RAMS.

rams," he said, "had proved wonder doers, and had cut 16 lb., 18½ lb., 20¾ lb., 21¼ lb., and 22¼ lb. of clean, long, bold, bright, strong wool." So pleased had he been with tne results obtained that he had induced two of his neighbors to make purchases from Mount Beevor. At the Adelaide Jubilee International Exhibition Mount Beevor wool was awarded three diplomas and a medal, and in the same year at the Royal Show prizes for three rams' and three ewes' fleeces. Mount Beevor representatives have taken a prominent position at the Royal Show, particularly in the aged classes, and they are held in high esteem by breeders throughout Australia.

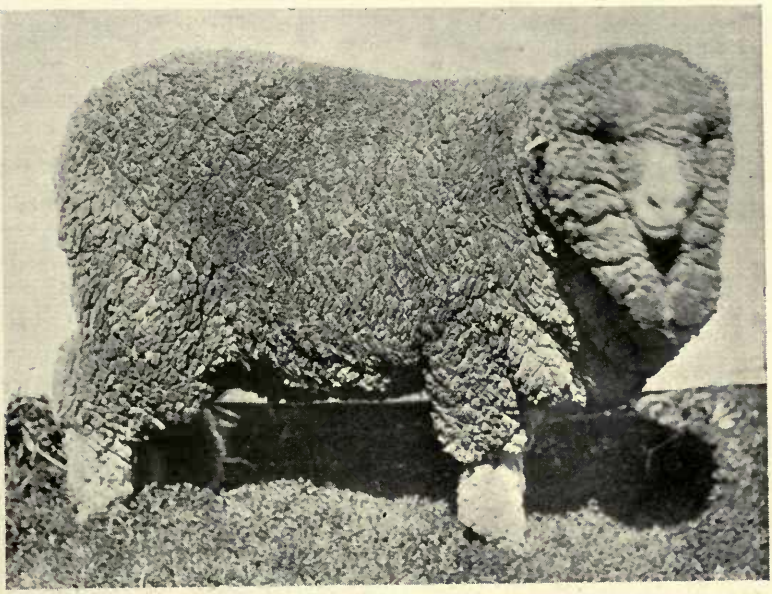


A MOUNT BEEVOR STUD RAM.

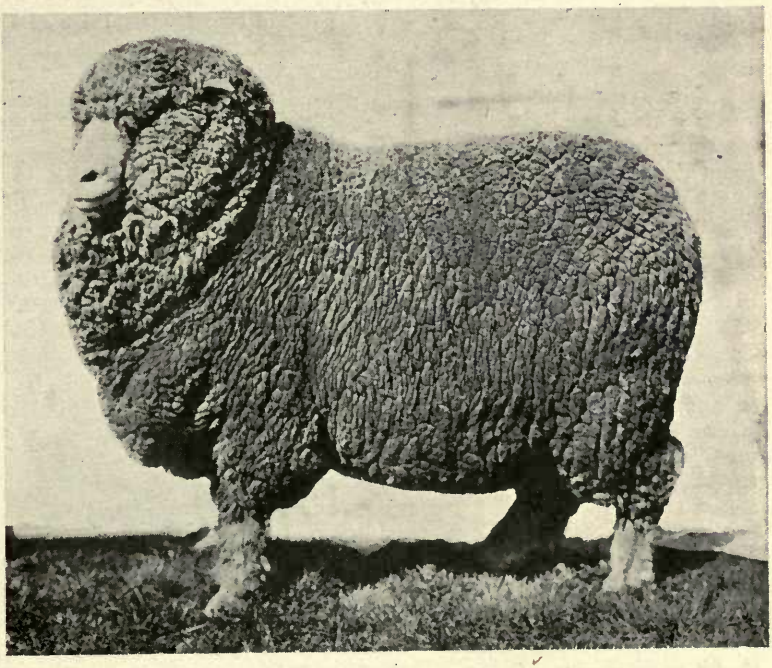
The Mount Crawford Stud.

Mount Crawford, the property of Mr. Alick J. Murray, is one of the oldest stud-breeding stations in the State. Unquestionably it has proved itself to be the most successful, for at Mount Crawford the late Mr. John Murray, in 1842, laid the foundation of the now famous Murray Merino sheep. It was in this well-favored district that the flock was gradually built up, and it was from Mount Crawford that the additional estates purchased by the founder for his sons were all stocked. Mount Crawford lies about 35 miles north-east of Adelaide in the high lands of the Barossa Ranges, and the best testimony of the country is that the flocks which have sprung from Mount Crawford are—after more than sixty years' close breeding—un-

surpassed in Australia for constitution, size, symmetrical frames, weight of fleece, and uniformity of type. Mt. Crawford Merinos are to be found all over Australia and New Zealand, and a number of them have gone to South Africa. At the last Christchurch Show in New Zealand, Mr. Andrew Rutherford nearly swept the ring in the 1 and 2-year-old classes both for rams and ewes, and won both champion prize for ram and for ewe with stock by the famous 500-guinea ram Fame, which he bought from Mr. A. J. Murray. Four hundred of the worst ewe weaners in the Mount Crawford stud were sold to Mr. George Maslin, of North Bundaleer, in 1902, taken home, shorn in 1902, and twelve months after running on Bundaleer when shorn again averaged 14 lb. of clean wool. The champion ewe, Flora van Senden, won 2nd prize in 1902 at Adelaide Royal Show, 1st in 1903, and champion in 1903, and won Dalgety Challenge Cup, not only right out, but for the third year in succession. This picture was taken after rearing a lamb, and the ewe then cut 16 lb. of light-conditioned wool.



"FLORA MACDONALD," by PORTSEA.
FIRST PRIZE under 1½ years, 1897. FIRST PRIZE under 2½ years, and CHAMPION EWE, Royal Show, Adelaide, 1898. Cut 18 lbs. 1 oz. Grazed at large on natural grasses only. Bred by and the property of ALICK J. MURRAY, Mount Crawford, S.A.



"FLORA VAN SENDEN."
Bred by and the property of ALICK J. MURRAY, Mount Crawford, S.A. Grazed at large on natural grasses only.

The Cappeedee Stud.

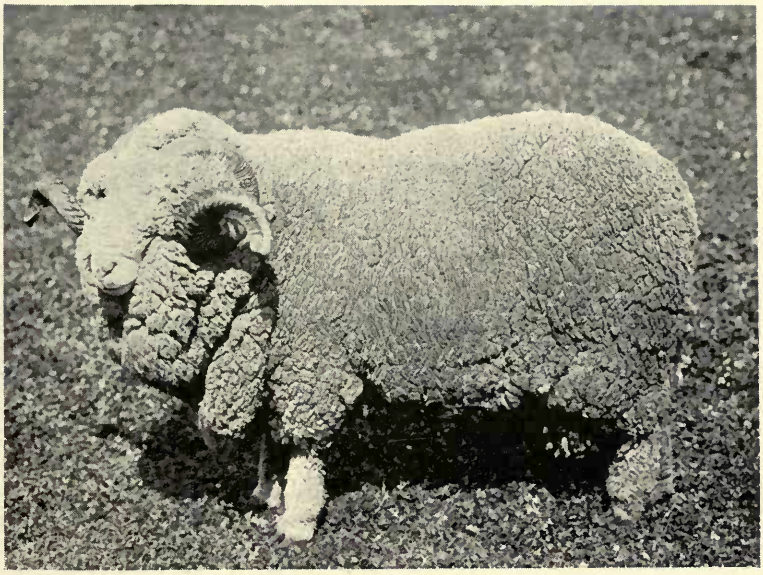
The Cappeedee Estate, situated near Hallett, about 125 miles north of Adelaide, was founded by the late Mr. John Murray in 1879. Drafts from Mount Crawford were sent from time to time, and Cappeedee was worked as a branch of the homestead until 1886. On the death of the founder of the original flock, Cappeedee and a fourth of the whole flock was taken over by the youngest of the four sons, the late Mr. W. A. Murray, and for fifteen years the Cappeedee stud was controlled by him with rare skill. He was a born flockmaster, and bred exceptionally large-framed sheep with deep necks, and carrying a fleece of great density. On the death of Mr. W. A. Murray in 1901, the estate and a portion of the flock, as already explained, came under the control of Mr. John Murray. Cappeedee is now worked in conjunction with Rhine Park, and is managed by Mr. Walter S. Murray, second son of the owner. The country is treeless, and, lying between two ranges of hills, is cold in winter and hot and dry in summer. There is no shelter of any kind, and sheep bred on this open country thrive splendidly in practically any climate to be found in Australia. The champion ram, Cappeedee, took the championship at the Royal Show two years in succession, and he sired a large number of prize winners.

"CAPPEEDEE"
Twice CHAMPION Royal Show Adelaide. Winner Silver Cup, Silver Medal, First Prize as 6-tooth.

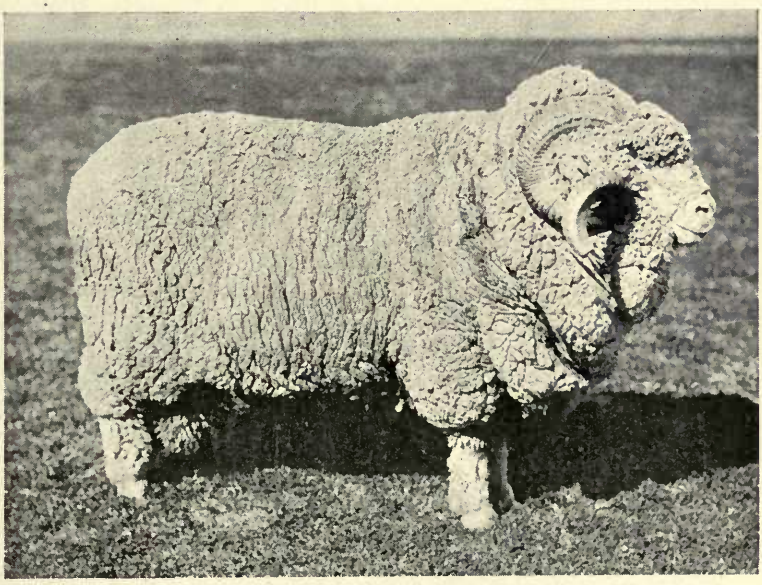
"MODEL," A Cappeedee Bred Ewe,
Twice a Prize Ewe, winner at the Royal Show, Adelaide.

The Bungaree Merinos.

The Bungaree stud flock was formed by the late Hon. G. C. Hawker very shortly after his settlement in the district. The original sheep were high-class ewes and rams from New South Wales. Fresh blood was introduced about 50 years ago, when five Negrette rams were added to the stock. In 1861 Rambouillet rams were used to effect a change in the blood, and in 1865 and 1874 rams bred at Mount Crawford were purchased and employed with success. The Negrette-Rambouillet alliance produced highly satisfactory results, the latter strain no doubt giving the principal Bungaree characteristics. The Bungaree sheep are noted for their sound, robust constitution, great size, symmetry, and weight of fleece. The Bungaree sheep are in favor in the hot, dry plains of the interior, where they do remarkably well, and yield a heavy fleece. Rams from this stud have been purchased by flockowners in all parts of Australia and South Africa, and their progeny have invariably given the highest satisfaction. Owing to their great size the ewes are much in favor with lamb breeders for crossing with Shropshires and other mutton-producing strains, the lambs from such a cross being especially suitable for export. The wool from this flock is well known as a sound, strong, well-grown combing wool of great length, and has always commanded high prices in the London market. For several years, and until the September show this year, the Bun-



"CRONJE."
Bred by and the property of Messrs. HAWKER BROS., Bungaree.

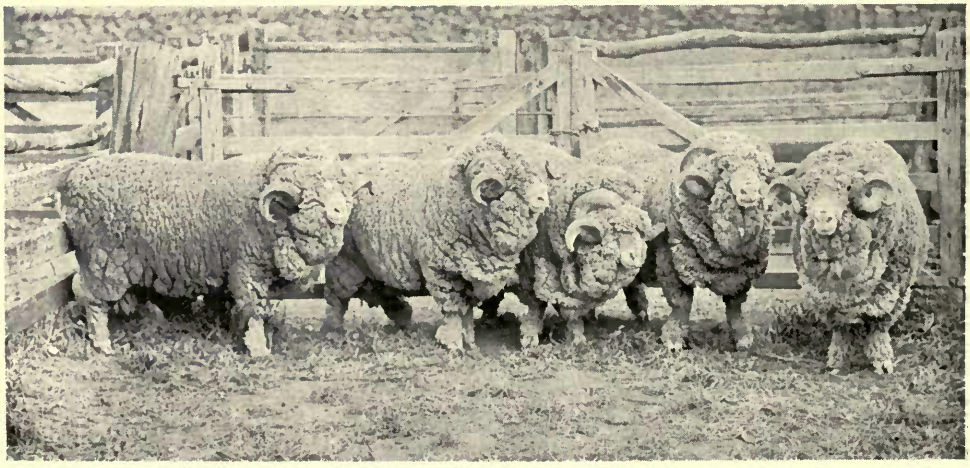


"CECIL RHODES."
First Prize Combing Merino Ram, Royal Show, 1903. Bred by and the property of Messrs. HAWKER BROS., Bungaree.

garee sheep have not competed at the Adelaide Show. Years ago, however, the stud was a formidable aspirant for exhibition honors, as the 100 or more prize tickets still preserved in the shearing shed abundantly demonstrate. One famous ram, Emperor, was never beaten, and took champion prizes in 1881, 1882, and 1883. At 6 years old his live weight was over 250 lb., and he cut a fleece of 22¾ lb., which 20 years ago was considered a remarkable weight. In 1883, in Melbourne, a ram from the station sold for £651. In 1886 Bungaree took 14 prizes for sheep (including three champions, one special, and two for fat sheep), and right on to 1892 the station was a constant and successful exhibitor. Bungaree Station is seven miles north of Clare, and 29 miles from Saddleworth.

The Canowie Stud Merinos.

Canowie Station, the property of the Canowie Pastoral Co., and managed by Messrs. H. & F. Rymill, of Adelaide, lies 12 miles due west of Hallett. The property extends to the bounds of Jamestown on the west, Yongala on the north, Cappeedee on the east, and Booborowie on the south, and takes in some of the finest grazing areas in the State. The present holding is about 67,000 acres, and is carrying close upon 60,000 sheep. Canowie sheep are well-known to Australian sheepbreeders for their splendid frames, constitutions, and profitable character. The stud was formed in the early fifties with 200 of the finest ewes in the sheepbreeding flock, and with them were used some imported Spanish Negrette rams, which arrived in 1857. In 1859 the stud flock of ewes comprised 500, in 1862 it was 780 strong, and in 1864 it totalled over a thousand. In 1860 the owners decided upon a change of blood, and introduced it in the shape of five French Rambouillet rams, and the result was highly satisfactory. The Rambouillets gave the sheep large frame, with a long staple of a bold type of combing wool. It is on record that one of these rams lived until he was 14 years of age, and his last fleece weighed 13 lb. of unwashed wool. A few sires were afterwards imported from the Mount Crawford stud, but for the last 40 years sires have only been drawn from within the flock. The great merit of the Canowie sheep in the eyes of experts is the general average of the flock. The sheep flock comprises 130 stud rams and 1,200 first-class ewes and



GROUP OF CANOWIE STUD RAMS.

GROUP OF CANOWIE FOUR-TOOTH STUD EWES.

500 second-class ones; 400 station flock rams, and 22,000 station flock ewes. In 1875 the proprietors decided to bring the Canowie sheep under the notice of the Victorian and New South Wales pastoralists, and entered their sheep for competition at the Victorian Stud Sheep Show held in Melbourne that year. Accordingly 23 Canowie rams were taken to Melbourne, half way by boat and half way in wagons by road. The rams showed abundant proof of their rough travelling, but notwithstanding this one took second prize, another third, while still another gained an honorable mention. They afterward figured conspicuously at the ram sales, brought the top price, and averaged 150 guineas. The result of such enterprise represented a new era for South Australian flockmasters. Victorian and New South Wales breeders became infatuated with the quality of the Canowies, and a steady demand sprang up for Canowie rams, and continues to this day In 1876 rams to the value of about £1,800 were placed. The sales then gradually increased, culminating in 1882. In that year £24,000 was received from sales of Canowie rams alone. A glance at the sheep on the run convinces one that they have lost nothing of the size, symmetry, and vigor of constitution which were the chief characteristics of their prize-taking predecessors. They are still noted for carrying fleeces almost unequalled for length of staple, density, and weight combined.

Wirra Wirra Stud Merinos.

The Wirra Wirra stud, the property of Mr. Murray Dawson, was formed in 1892, and a splendid foundation was laid with selected rams and ewes obtained by Mr. Dawson from his uncle, Mr. Alick. J. Murray. The Wirra Wirra property was at one time part of the Mount Crawford estate. The sheep have been bred in with great care since 1892 with excellent results. Mr. Murray Dawson has sent some splendid representatives of his stud to the Royal Show at Adelaide, and has had the satisfaction of taking a number of prizes in the leading classes for sheep, and also for fleeces. Mr. Dawson aims at producing Merinos of strong masculine characteristics, carrying heavy fleeces of high quality wool. In addition to the Wirra Wirra Estate, Mr. Dawson has a property near Gawler Plains, to where the sheep are taken during the winter.

WIRRA WIRRA STUD RAM "SULTAN."

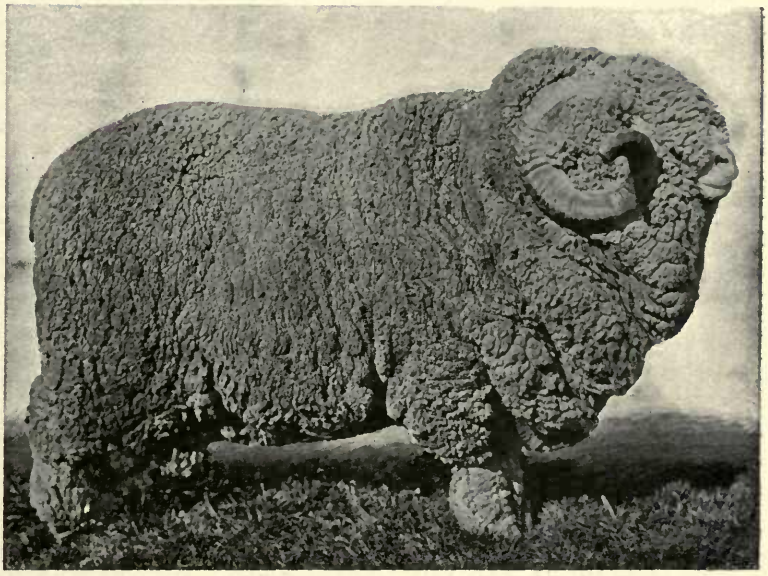
SECOND PRIZE, 4-tooth, Adelaide, September, 1903. Bred by and the property of MURRAY DAWSON, Wirra Wirra, S.A. Grazed at large on natural grasses only.

WIRRA WIRRA STUD EWE.

Bred by and the property of MURRAY DAWSON, Wirra Wirra, Mount Crawford.

Rockbrook Stud Merinos.

The Rockbrook Estate is the property of Mr. W. D. Crozier, and is situated near Kapunda. Mr. Crozier concentrates his efforts towards the production of high-class Merino sheep, of which the above pictures are typical representations. The Rockbrook stud is built upon a substantial foundation, having sprung from the Horseshoe stud on the River Murray, N.S.W. The Horseshoe stud was established by sheep from Moorna Station, which for over 30 years has been noted for producing animals especially suited for inland Australia. The Horseshoe stud was removed to Rockbrook in 1896. Rockbrook sheep have come rapidly to the front, Mr. Crozier having won championship honors at the Royal Show, Adelaide, in 1898 and 1903.



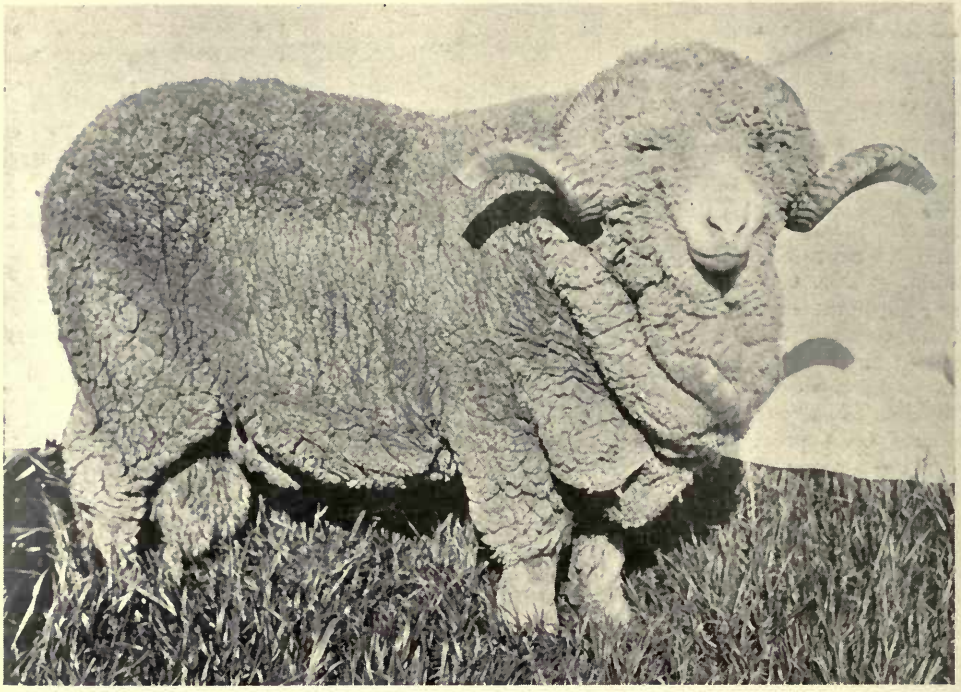
"CHUNKY."
CHAMPION, R. A. & H. Society's Show, Adelaide, 1903.

"WESTERN PRIDE."
2-tooth Ram, sold to West Australian Buyer. Won FIRST PRIZE 1½ year-old Ram, Guildford Show, W.A., 1903.

The following are the average weights of wool of all sheep shorn for 1903:—

	lbs.	ozs.
Highest ram	27	5
Highest ewe	20	1½
All working rams 3½ to 8½ years old	21	3¼
All 2-tooth rams	20	3⅝
All 4-tooth rams	23	9¾
All grown sheep	14	2½
All lambs	4	11

1st Fleece brought 9¾d. to 10d., and 1st lambs 8¼d., Adelaide, 1903. Wethers from this flock have brought 40/ each at auction in the local sale yards in month of May.



PRIZE RAM "HECTOR."
Bred by and the property of the Trustees of the late Hon. Walter Duffield.

The Koonoona Stud Merinos.

The Koonoona stud Merino flock dates back to the year 1863, when a selected draft of the original Fisher ewes were mated to a high-class ram from Mount Crawford. From that date onwards the most careful attention has been paid to the preservation and improvement of the stud and flocks, and the aim has been to grow a big mutton sheep carrying a heavy fleece of bold combing wool. The estate comprises some 32,000 acres of freehold land, besides some leasehold, and about 27,000 sheep and lambs are annually put through the shed. The country is chiefly undulating to high range, and the sheep are much exposed in winter, feed making slow growth during the wet months. The Koonoona sheep have met with considerable success in the Adelaide show ground, and stud and flock rams meet with a ready sale, and find their way to many parts of Australia, and have also been purchased for Tasmania. Owing to the rigid care over the general flock sheep outside of the stud, the Koonoona surplus stock always excite keen competition in the markets, and high prices are obtained. In evidence of the profitableness of the flock, we (?) have obtained permission to quote the following figures relating to the averages clipped at the recent 1903 shearing:—20 first stud rams averaged 22 lb. 8½ oz., highest 26 lb.; 120 flock rams, 2½ to 8½ years old, averaged over 19 lb., highest 29 lb.; 10 two-tooth stud rams averaged 20 lb. 4 oz., highest 23½ lb.; 50 two-tooth stud rams averaged 17 lb.; 20 special two-tooth stud ewes averaged 15 lb. 8 oz., highest 18 lb.; 800 six-tooth wethers averaged 16 lb. 3 oz.; 18,784 grown sheep, of which over 12,000 were ewes, averaged 11 lb. 3¼ oz.; 6,984 lambs averaged 4 lb. 4 oz. This wool sold up to 10d. per lb. at the Adelaide sales. Koonoona is situated seven miles south of the Burra, and about 90 miles north of Adelaide. It belongs to the estate of the late Hon. Walter Duffield, and Colonel Makin and Mr. D. Walter Duffield are the trustees, and has been under the management of Mr. W. G. Hawkes for many years.

W. Gill photo. *A View of Keyneton Estate and Homestead.*

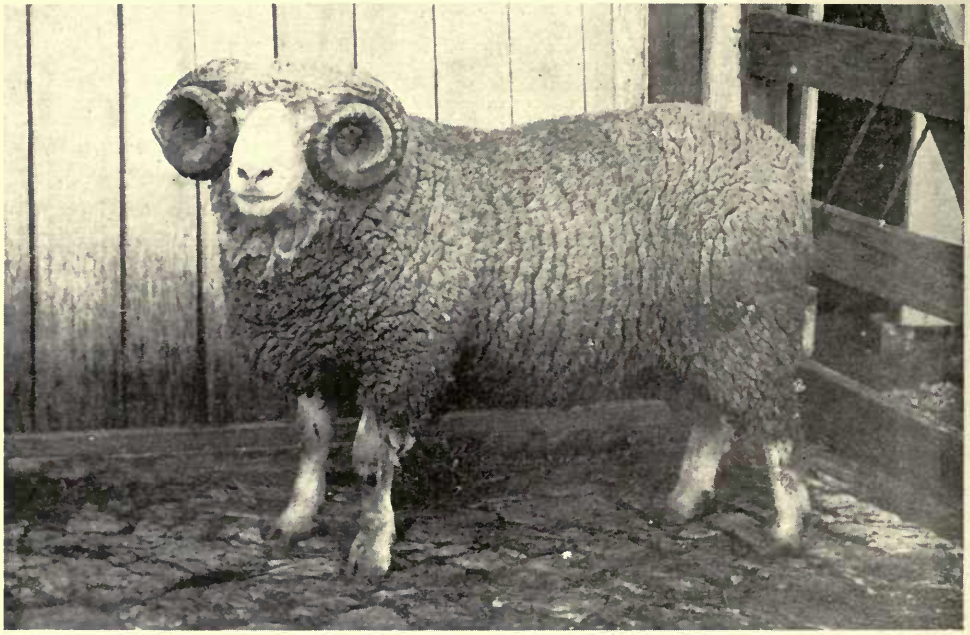
The Keyneton Merino Stud.

The Keyneton Merino flock, the property of R. R. Keynes, of Keyneton, though not large, is a choice one. It was established sixty-one years ago by the late Joseph Keynes, the foundation of the flock being formed by the purchase of sheep from early settlers, including the late John Murray. In 1858 two rams were imported from the flock of A. Steiges, Saxony. Subsequently Murray rams were again introduced. Since 1877 no rams but those bred at Keyneton have been used. The Keyneton Merinos are noted for their robust constitutions, and do well in any State of the Commonwealth, where they are well known. Prizes for fleece have been won at Adelaide, viz.: First prize 3 rams' fleeces in 1885, International Exhibition, Philadelphia, bronze medal and certificate of award, 1876, and Colonial and Indian Exhibition with Commemorative Medal, 1886. The latter fleeces were from sheep bred by the present owner. Prizes for sheep have also been taken at Angaston, 1858, and Mount Pleasant and Kapund. Shows at later dates.

The Ulooloo Dorset Horn Stud.

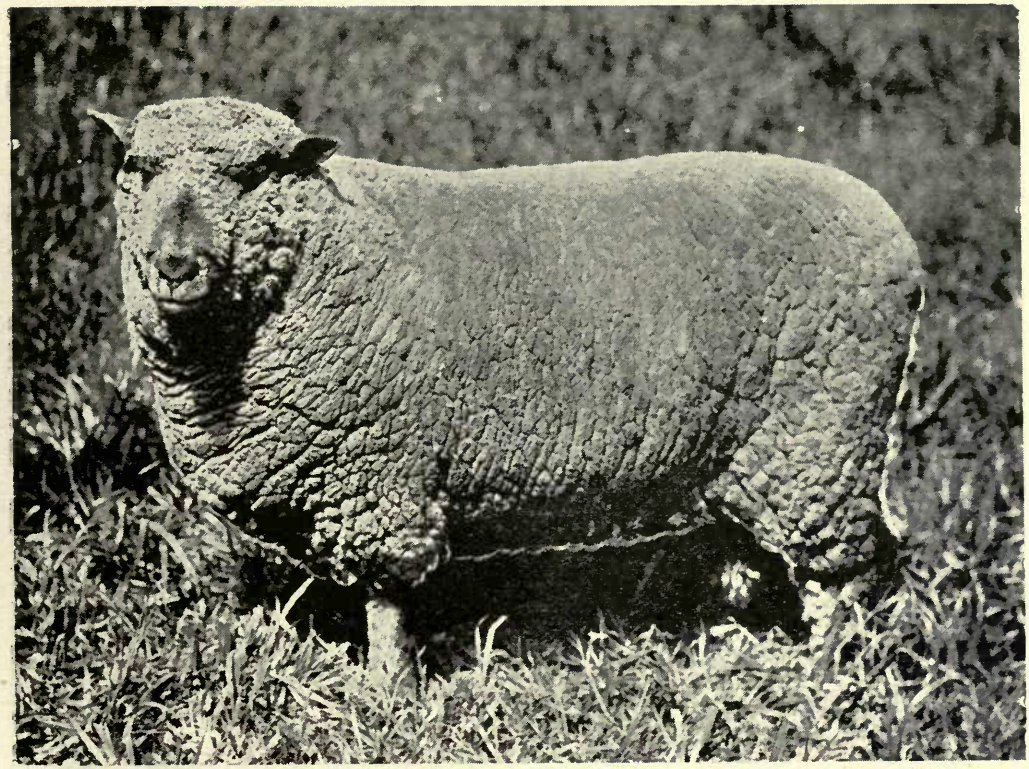
Mr. John Melrose was the pioneer importer of the Dorset Horn breed of sheep to Australia. In 1895 he introduced eight stud ewes and one stud ram from Dorsetshire and one ram from Somersetshire. The sheep were carefully selected in England, and from the first they established themselves as favorites in Australia. The fleece much resembles the wool of high-class crossbreds, being strong, bold, and soft with good density across the back, and coming well down the sides, arm, and thigh. The Dorset has good carriage and great activity, is set on good legs, and has sound feet. In carcase and shape it is all that a butcher could wish for, having

good depth of rib, finely turned buttocks, deep through the heart, broad and straight along the back, with full, prominent briskets. The Dorset matures early, and a cross with the Merino produces a type of lamb suitable in every respect for the export trade. At the Roseworthy Agricultural College a series of experiments have been conducted with various crosses for the production of an early-maturing lamb of high quality and the Dorset Merino cross has produced the best results. A pen of Dorset-Merino progeny took first prize for fat lambs at the Royal Show held in Adelaide last September. The Dorset cross with the Merino is becoming popular among lamb breeders, and they are drawing upon the Ulooloo stud for suitable sires.

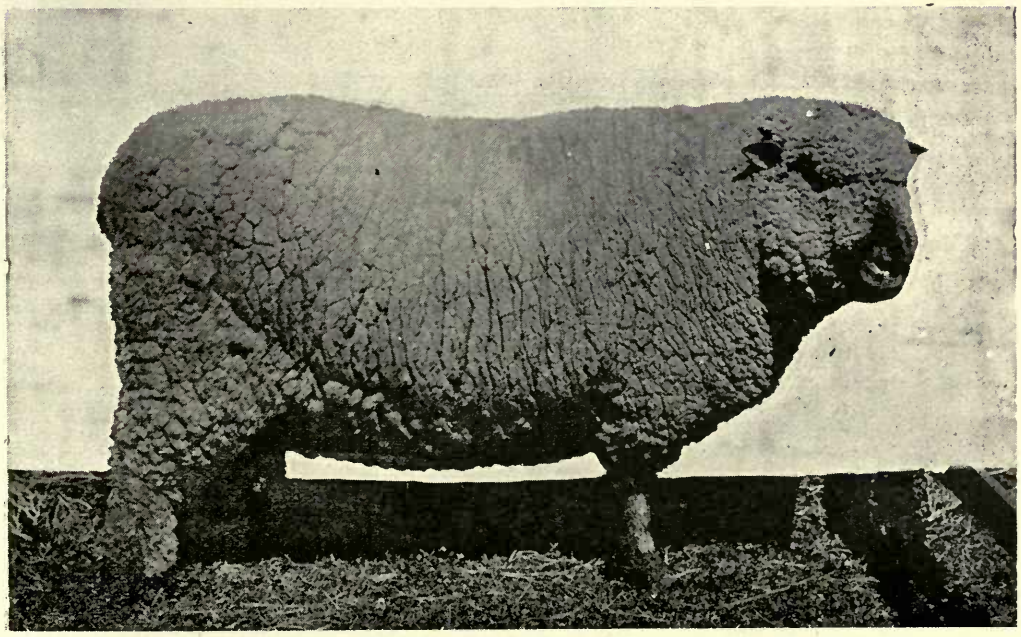


"SOMERSET," by GLOUCESTER, by PRESTON BOY.
Dorset Horn Ram, property of Mr. JOHN MELROSE, Ulooloo.

IMPORTED DORSET HORN EWES.
Bred by Mr. W. C. GROVES, Wilverton, Dorchester. Property of Mr. JOHN MELROSE, Ulooloo.



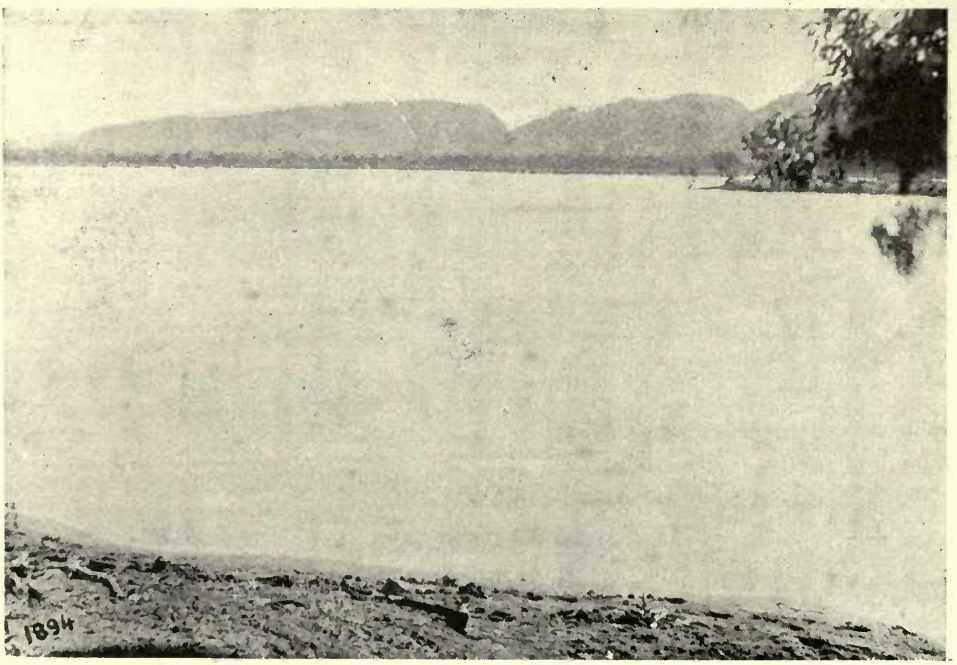
STUD RAM, "BATH BISHTON." First Prize and Champion, 1897.
The property of Richard Smith, Sweet Home, Strathalbyn.



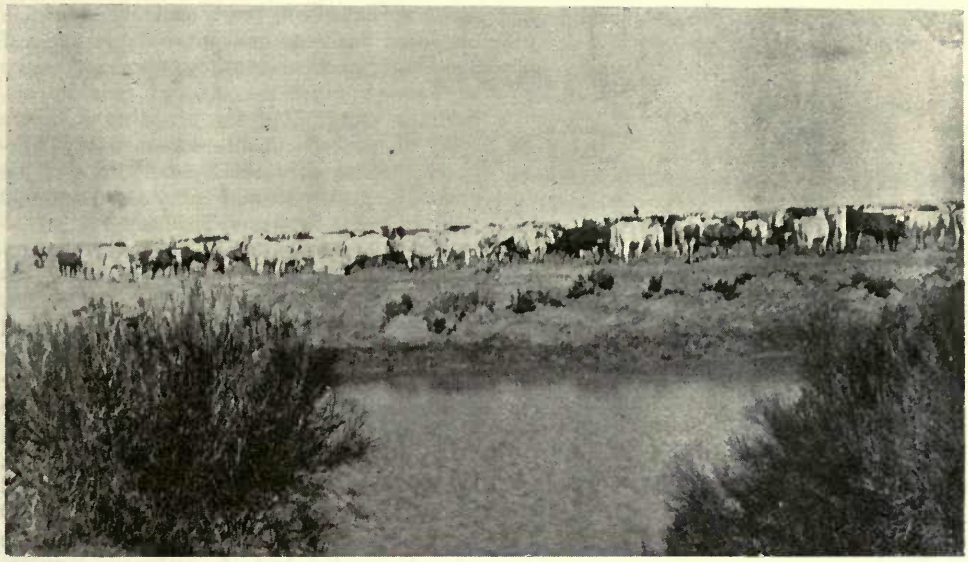
"KINDARUAR ROYAL."
The property of Richard Smith, Sweet Home, Strathalbyn.

The Sweet Home (Kindaruar) Shropshire Stud.

The Kindaruar stud flock of Shropshire sheep was established in 1894. The estate, which was situated near Lake Alexandrina, was recently sold by Mr. Smith, and the flock removed to his Sweet Home Estate—a beautiful property near Strathalbyn. The flock was founded by the purchase of 25 high-class pedigreed ewes from Mr. Thomas Mason, of Tasmania. In 1896 a further consignment of 10 high-class pedigreed ewes was received from England from the flocks of Messrs. Peter Everall, Ryton Grove, Shropshire; Thomas Jones, Cotwell, Shropshire; and Richard Bromley, Felton Butler, Shropshire. These ewes were served by some of the best rams in England. A special stud ram, Bath Bishton (7,822), sire Bath Brick (5,797), sire of dam Bishton Long Lad (3,367), sire of g.dam Blue Patriot (2,400), sire of g.g.dam Treble C. II. (1,7/6), bred by Mr. J. Bowen Jones, of Shropshire, was brought out with these ewes. In 1897 30 pedigreed ewes were chosen from the flock of Mr. R. Studley Steel, and in 1897 a second importation was made from England of six ewes and one ram, the best procurable in England. The selection of the English stock was entrusted to Mr. Preece, of Shrewsbury, who is one of the most expert judges in England. The ram selected was Corston Royal Victor, sire Corston Victor (8,951), sire of dam Blink Bonny (7,323), sire of g.dam Lord Patriot (4,267), sire of g.g.dam Corston, True Blue (2,550). Up to March, 1903, the following prizes fell to the Kindaruar Shropshires:—Adelaide—One ten-guinea cup, 4 champions, 10 firsts, 9 seconds, 3 thirds, first prize for three rams' fleeces, first prize for three ewes' fleeces. Country—1 ten-guinea cup, 11 champions, 16 firsts, 20 seconds.



View at the Undoolya Cattle Station, Central Australia.



Mob of Cattle in Central Australia. The water is from an artesian well.

Cattle Raising.

Tasmania was the chief source of meat supply for a few years after the proclamation, but owing to heavy losses during transit, importations were few and far between. But for the splendid daring of the "overlanders" who pushed their way over trackless mountains and unknown forests, swam their flocks and herds across the rivers, it would have taken many years to build up the wool and meat industries. As it was the flocks and herds multiplied so rapidly that within seven years boiling down works—the common outlet of surplus years—were established. With the advent of the meat export trade, boiling down works have passed away, never to be re-established. There are other and more profitable outlets for surplus stock. It was on April 3, 1838, that the first herd of cattle and horses arrived in Adelaide overland from Sydney. It comprised 335 head, and was in charge of the owner, Mr. Joseph Hawdon, who, during the journey of ten weeks, lost only four bullocks. To celebrate this important event 90 gentlemen sat down to a public dinner, and an ox chosen from the herd was roasted whole. A snuffbox was presented to Mr. Hawdon in the name of the people of South Australia, and the recipient, in returning thanks, announced his intention of settling in Adelaide "with all the force he could gather." Of the arrival of Joseph Hawdon and Charles Bonney Mr. Anstey, an old colonist, has written:—"Never can I forget the impression made on my mind by the arrival in Adelaide of Messrs. Joseph Hawdon and Charles Bonney, successfully conducting from New South Wales the first overland herd of cattle and horses from the Sydney side. Their arrival was unexpected by us. In those early days of the colony there were no intercolonial posts save at long intervals, and it was the natural desire of the first overland parties organised for Adelaide to keep their journeys with their herds of cattle and flocks of sheep as secret as possible from the public. The news of their arrival spread like wildfire." Mr. Eyre, who subsequently won renown for his exploring exploits, was the second overlander with cattle, and Capt. Sturt was in charge of the third party. From

that time onwards cattle raising became a profitable industry, and the herds gradually increased, as may be gathered from the following:—

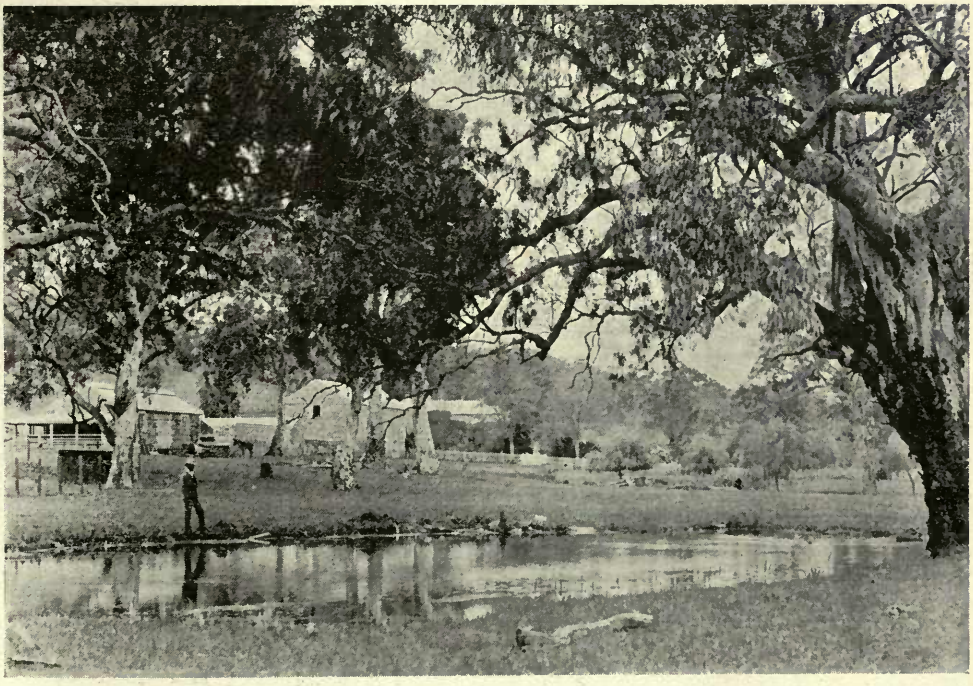
Year.	Number of Cattle
1838	2,500
1840	15,000
1850	60,000
1860	278,000
1870	136,000
1880	307,000
1890	359,000
1900	214,000
1902	225,256

The highest point reached was in 1893, when it was estimated there were 423,000 cattle in the country. The fifties witnessed a marvellous expansion of the cattle stations, but progress was checked when the pastoralist, forced to make room for the pioneer, had to carry on his operations in less favored localities. Cattle raising on an extensive scale is now restricted to what is termed "outside country"—that is, the saltbush plains of Central Australia and the Northern Territory, where there are extensive runs.

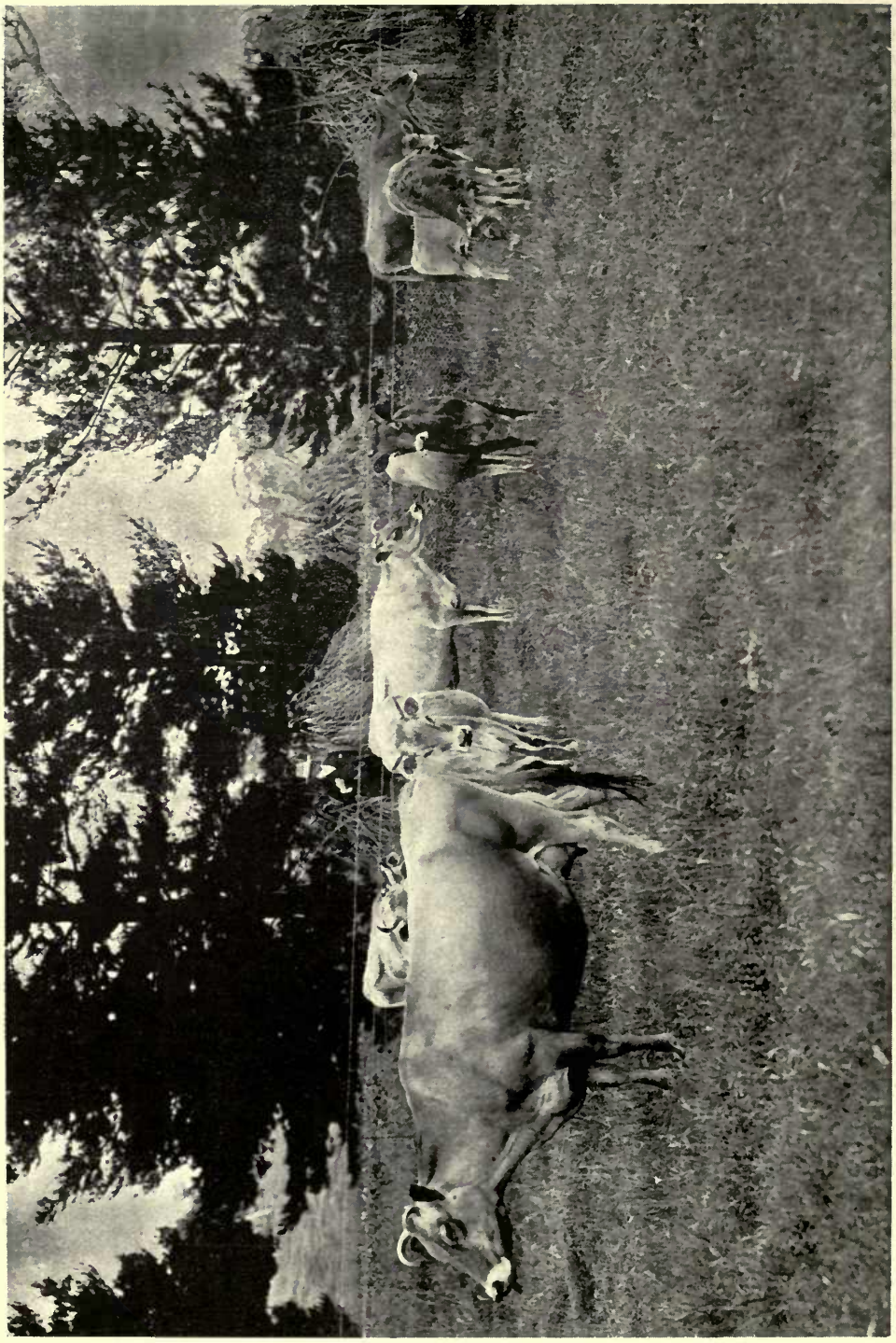
There is a vast tract of splendid cattle country in the north of South Australia, only the fringe of which is occupied. Difficulties of transit have hitherto prevented the development of this territory, but with the improvement of stock routes, ranchmen should be attracted to the possibilities of establishing themselves in localities where the rent is low, and where climate and natural advantages are eminently suited to cattle raising. Mr. David Lindsay, the explorer, states:—"Oodnadatta to Charlotte Waters is in the driest belt in Australia, the average rainfall being about six inches; yet much of it will stand light stocking, and as it is within the artesian water area the precious fluid can be obtained by boring. Including the wonderful nest of springs known as Dalhousie, it should carry (say) 30,000 cattle, besides being an ideal country for the Angora goat. Proceeding northwards the rainfall gradually increases, and we find belts of fair to good pastoral country, with some natural waters—and water can be had by sinking—whilst there are many places suitable for conserving water. This should depasture at least 15,000 cattle. The MacDonnell Ranges, extending east and west of the proposed railway, present a large area of excellent pastoral country, good for sheep or cattle; and magnificent for horses, perhaps unequalled for breeding a hardy type of horse suitable for military purposes. The climate is beautiful. This tract of country should carry (say) 150,000 head of great cattle. The mineral belt—the development of which awaits the advent of the railway—is, I feel sure, an extensive one of great promise. The district known as Arltunga is already proved to contain payable gold mines; but how can this field be exploited when for over 400 miles the supplies and machinery have to be carried on camels or wagons? Still on northwards, the rainfall increasing at every stage, we pass through pastoral country, capable of carrying (say) 30,000 cattle, to Tennant Creek, which is on the edge of another belt of auriferous country, in which prospectors have found quartz reef carrying gold in sufficient quantities to be payable with rail communication. Just east of Powell Creek we find the edge of a magnificent pastoral country stretching away to the Queensland border, having many natural waters, and promising to have abundant supplies underground. This belt of country should carry (say) 900,000 great cattle. Then away to the westward, right over to the border of Western Australia, is a large tract of magnificent pasture land fit for sheep or cattle, with I believe, another belt of auriferous country. This extensive region, which would be served by the railway, is capable of carrying (say) 300,000 great cattle. Newcastle Waters is on the edge of another large area of good pastoral country. At this station at present there are 7,000 fat cattle, but no means of getting them to any market. The whole of the country to the coast would carry stock (say) 200,000 cattle. From the break of the tableland to the coast, a strip of country containing about 100,000 square miles, is not only capable of carrying some stock, but is rich in all the minerals, and the soil and climate are admirably adapted for the growth of all products indigenous to those latitudes. Mr. Ernest Favenc, a recognised authority on

Central Australia, states that back from the Powell Telegraph Station to the head of the Nicholson River he found "a large quantity of valuable cattle land country, well and permanently watered. . . . The country on the southern slope is of a nature known all over Australia as being of the best description for sheep. The country drained by the coast rivers is of a different character—better watered, not so well grassed, and only adapted for cattle, with the exception of the Macarthur and the head of the river I called the Parsons. The territory possessed by South Australia, viz., from the sixteenth to nineteenth parallels of latitude, is of a description calculated to invite settlement. The rivers, though rough and not exactly trafficable, are full of large, deep, and permanent lagoons. The country is not suited for sheep, although in these spinifex ridges there is any amount of herbage and vines, which are very fattening for the cattle. In fact, during my various trips across the Territory I have always found that, in even what is known as the worst spinifex desert, there are vines and grasses that horses are always eager for, and do well on. With regard to the spinifex country, I should like to bring under your notice the fact that many people are now recognising the value of these hitherto abused tracts. The spinifex itself is valueless, but the country on which it grows is often rich in different kinds of herbage and vines that alone serve to fatten."

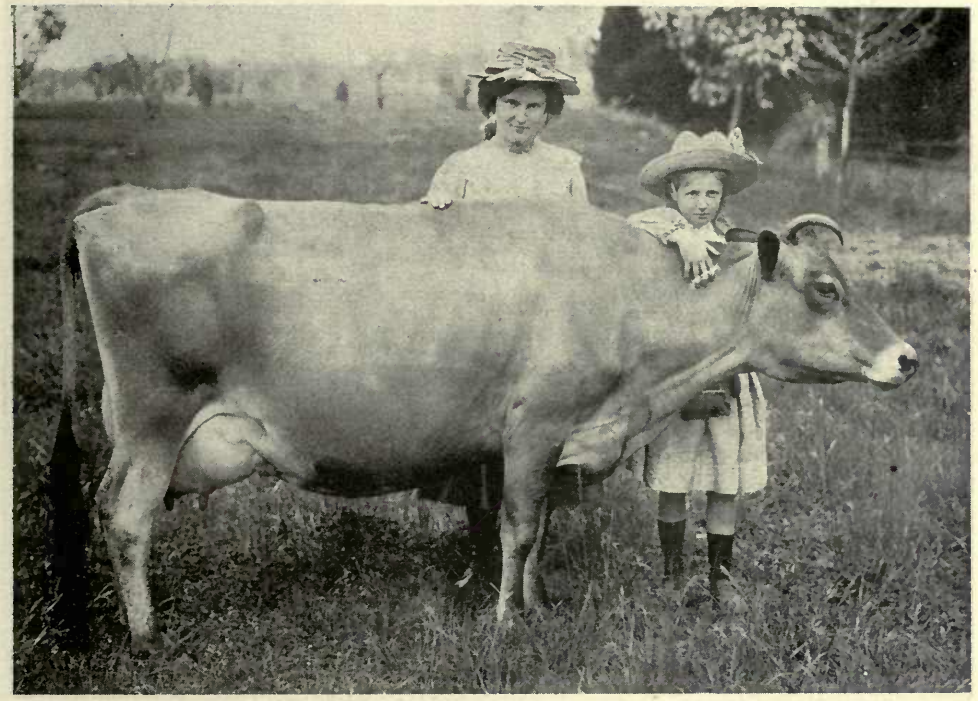
Considerable attention has also been devoted by several breeders to the production of high-class Ayrshires and Jerseys whilst splendid specimens of the noted milkers, Holstein-Freisans, have been imported.



A View at Mount Crawford, the property of Mr. A. J. Murray.



S. J. Dailey photo. ***Group of Champion and Prize Jerseys.*** *The property of Alick. J. Murray, Mt. Crawford.*



Champion Jersey Cow, "Maitland Charlotte." The property of Alick. J. Murray, Mt. Crawford.
S. J. Dailey photo.

Mr. Alick. J. Murray, of Mt. Crawford, owns one of the choicest herds of Jersey cattle in Australia. The great "utility" cow took his fancy some years ago, and the more he studied the records of the island butter-producers the more strongly was he persuaded that they fulfilled all the conditions required by dairymen with whom the production of butter was the first consideration. He laid the foundation of his herd by careful purchases made in Victoria from high-class imported stock. He was fortunate in obtaining possession of Progress III., a very superior imported bull, and this animal stamped his high qualities on the Mt. Crawford herds. Mr. Murray also bought several imported cows from the late Mr. Woodmason, of Victoria, and at a later date a bull and two heifers, imported by the Rev. Ralph Brown, were added to the Mt. Crawford herd. The most important purchases were made on Mr. Murray's behalf in the Island of Jersey. These comprised two bulls and a heifer, Maitland Charlotte, and the latter's qualities may be gathered from the fine illustration given of her above.

Messrs. Fowler and De La Perrelle, of England, recognised authorities on Jersey cows, spent some time among the best breeders and farmers of Jersey Island making these purchases for Mr. Murray. They wrote to him:—"We are really proud of our selection, for we do not consider that there has been a better lot sent out to Australia. The older bull is by far the richest that has passed through our hands. We cannot say too much of the younger bull. He is really an almost perfect animal. The heifer is really a picture, and should be an easy prize winner." This high estimation of the animals has since been abundantly confirmed at the Royal Shows in Australia, where they have occupied the front rank. The Mt. Crawford Jerseys have practically swept the boards at the Royal Shows in Adelaide, and are largely sought after by the stud breeds and dairymen throughout Australia. All the Mt. Crawford Jerseys are descended from cattle in the Island Herd Book. The cow, Maitland Charlotte, yielded 17 lb. 5 oz. of butter in one week 8½ months after calving when grazing in the paddocks on natural grasses.

Rugia Niblett 11th. *Lord Waterloo 6th.* *Rose of Connaught 16th.*
Champion Shorthorn Cattle, Melbourne, 1898. Bred by and the property of
S. G. Spink photo. *J. H. Angas.*

Mr. J. H. Angas has been a breeder of high-class cattle for over sixty years. He founded his now celebrated stud of Shorthorn cattle by purchasing twenty picked heifers and an imported bull of the Bates breed, and experts are of opinion that the Angas stud is the only one in Australia that has retained the true Bates type. These animals were acquired from the South Australian Company, but as the years went on Mr. Angas introduced new blood from England, including a shipment of 21 head in 1879. No expense was spared in securing the highest class animals, and the Angas stud of Shorthorn cattle are famed throughout Australia. English experts have declared that Mr. Angas has produced a type superior in many respects to the stock from which they sprang, and efforts were made at one time to ship specimens to England for competition at the leading shows. Quarantine regulations proved an insurmountable barrier. Mr. Angas, however, sends a fine string of Shorthorns to Sydney and Melbourne, where on many occasions he has practically carried everything before him. In South Australia his cattle are unapproached by any other stud. The Shorthorn stud, numbering about 400 head, is kept at Point Sturt, on Lake Alexandrina, near Milang. The property is entirely devoted to the purpose. The stock have great wealth of flesh, and fatten to very heavy weights, cows frequently dressing over 1,200 lb. A ready market is obtained for the young bulls, which are generally cleared before they are two years old to breeders in all the Australian States and New Zealand. Sires from the Angas stud have been used in all the principal studs of Shorthorns in Victoria and New South Wales, and as much as 500 guineas has been obtained recently for a young bull under one year old to New Zealand. Mr. Angas established his now famous Hereford herd in 1869 by importing high-class animals from England. This splendid beef-producing breed is in high favor in Australia, and the Angas representatives find their way to all parts of the Commonwealth.

The Lamb Export Trade.

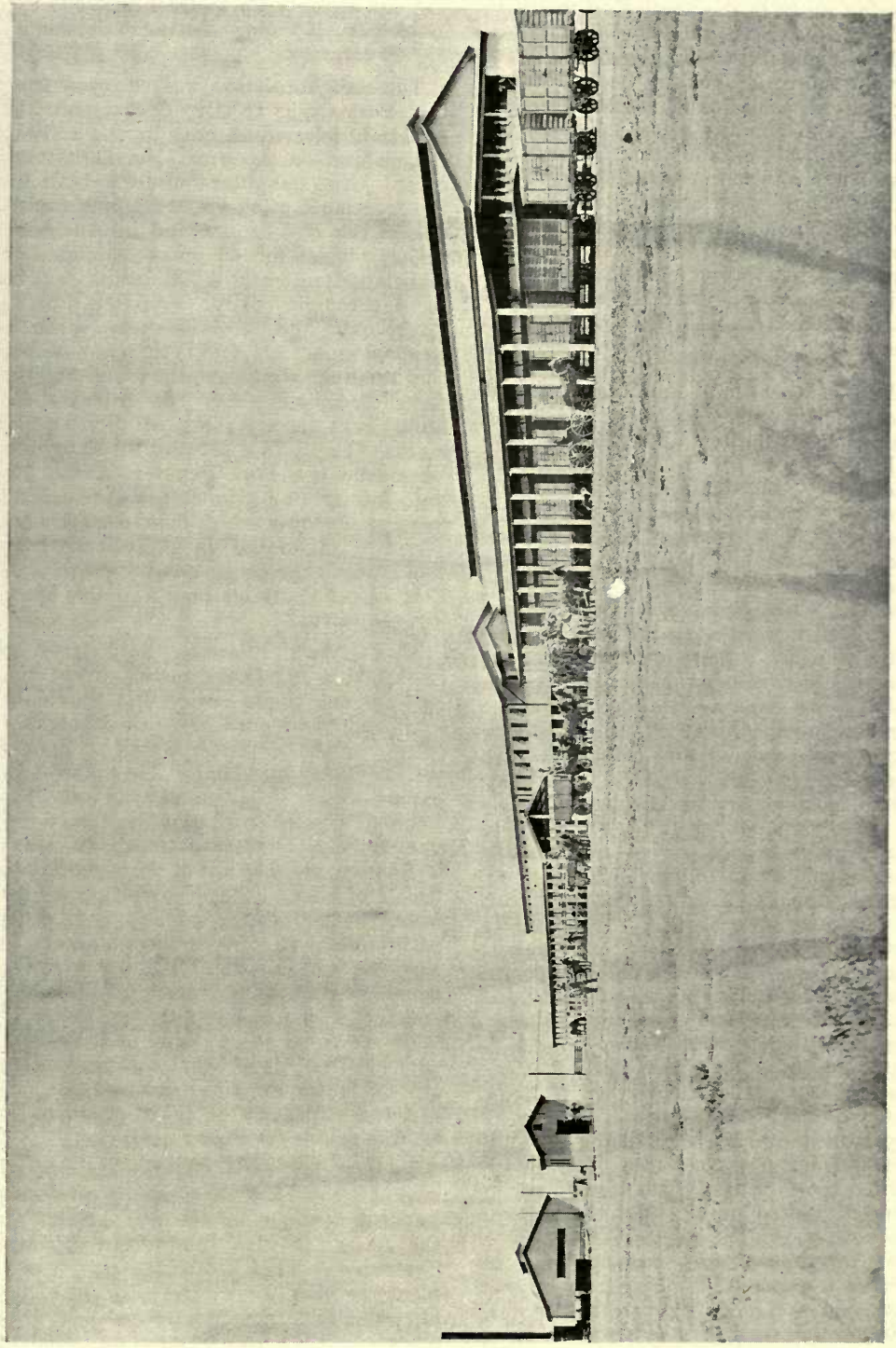
It was Charles Dickens who once remarked, at an agricultural dinner, that "the field which paid the farmer best to cultivate was the one within the ring fence of his own skull." That statement contains a more important truth to-day than it did in the time of the great novelist. Science is conspicuously aiding the tiller of the soil who places himself in a position to be assisted. Improved ocean transit has brought the producer in Australia and the consumer in the centres of population in Europe closer together, and the refrigerating chamber is opening up almost unlimited opportunities for the expansion of trade. The remarkable success which attended the experiments made in New Zealand in the shipment to England of frozen meats compelled Australian breeders to look askance at the "boiling down" works which were employed for the purpose of dealing with surplus stock in times of plenty, and relieving the pressure when droughts came. With a threatened scarcity of feed and water before them, pastoralists were sometimes forced to sacrifice their stock in a flooded market. Sheep used to be killed for the sake of the skins and the carcases either left to rot on the ground or sold for a few pence per head to the owner of the nearest boiling down works and turned into tallow. The advent of the freezing process and the refrigerating chamber in the ocean steamer altered all this, and the day of the "boiling down" works passed away never to return. The results obtained in the land of the Maori suggested to enterprising breeders in South Australia the need of introducing types of English mutton breeds of sheep. These were wanted for the purpose of crossing with the hardy Australian Merino, which had hitherto been raised chiefly from a wool point of view. Breeding lambs for export followed closely on the importation of the Shropshire, Dorset Horn, and the Down breeds. In this connection the Chief Justice of the State, Sir S. J. Way, and the manager of his Kadlunga Estate, Mr. F. H. Weston, are entitled to the gratitude of stock owners and the community generally, for they were the pioneers in the introduction of the mutton types which made lamb-breeding possible. One of the most gratifying features in connection with this industry was that from the outset farmers rather than pastoralists went into the business. This led to the multiplication of farmers' flocks, and the innovation has had a marked effect, not only on the agricultural industry, but upon the wool trade. The introduction of sheep to the farm was the means of directly increasing the producers' resources of revenue on the one hand whilst improving his methods of cultivation to his general advantage. The wool trade benefited to a considerable degree; the steady increase in the number of sheep within hundreds largely compensating for decimation caused in the flocks of pastoralists in the outside country. During recent years there has been an increase of 10,000 in the flocks in the Central Division of the State, and 122,000 in the South-Eastern, and this at a time of general decline elsewhere owing to the drought! The number of sheep within hundreds is the largest for six years, notwithstanding the increasing number of carcases sent away. The local wool sales are largely assisted by the small lots of wool sent in by farmers who keep sheep mainly for the purpose of breeding lambs for the export trade.

Early in the nineties attention was directed to the advantages which would be likely to follow the erection of freezing works. Leading pastoralists were sceptical. They gave three main reasons for not joining forces in order to follow the example set by New Zealand. First, that a continuity of the supply was uncertain under conditions then existing. It was pointed out that local consumption took all the sheep that were in any degree suitable for export, and "surplus" supplies would have to be imported. The second objection was that the right kind of animal required for freezing was not bred;

and thirdly, that the bulk of the country was not adapted for the carrying of the large-sized mutton breeds. All three objections have been removed. There is a "continuity of supply" from sources undreamt of ten years ago. The "right kind" of sheep are now bred in various parts of the State, and a large portion of our country has been proved to be eminently suited for the raising of animals that meet with ready approval in England. It was at one time asserted that sheep for export must be "artificially fed." That theory has been completely exploded, thanks to the wonderful fattening qualities of the pasture grasses of the State. The grass-fed lambs of South Australia mature earlier than do those grown in any other part of the Commonwealth. In every respect the South Australian article is equal to the best that are shipped from any other State.

The first practical attempt made in South Australia to establish freezing works was in 1894. It was my privilege to become possessed of information concerning what had been done in New Zealand. Valuable facts were tabulated and brought under the notice of sheep owners, merchants, and capitalists. Whilst without exception they were impressed with the wonderful results which had been obtained in New Zealand, the objections already stated were put forward as reasons why South Australia could not hope to make a success of the business. Eventually I was invited by several gentlemen, who began to realise that something had to be done, to draw up a prospectus for a company. Because of its historical interest in connection with the frozen meat trade, in view of the developments which have taken place, a summary of the document which represents the first practical effort to introduce what is now an important industry is given in response to requests that it should be placed on record. The company was to be called the "South Australian Freezing Co., Ltd.," and the capital was fixed at £10,000. The "objects" set out were:—"1. To establish a butter factory and produce stores in or near Adelaide. 2. To establish freezing works and cold stores at Port Adelaide. 3. To receive and forward to Australian, British, and foreign markets butter, bacon, pork, beef, mutton, poultry, rabbits, eggs, cheese, wine, fruit, and other farm, dairy. and garden produce, frozen or otherwise. 4. To arrange for the sale and distribution of produce in London and other populous centres. 5. To provide local outlets for produce of all kinds and in any quantity. 6. To improve the quality of produce and the methods of placing it before consumers. 7. To assist farmers and others to start creameries, &c. 8. To minimise the present high charges to which producers are subjected. 9. To bring producer and consumer into closer business relations. 10. To act as salesmen and forwarding and commission agents." It was further stated:—"It is proposed that the freezing works and cold stores at Port Adelaide shall be placed afloat, and so obviate the heavy lighterage and other incidental charges now paid by producers. The provisional directors are in possession of special advice as to the construction of these floating freezing works and cold stores, and believe that some of the latest and best machinery is immediately available." The prospectus also said:—"The successful development of the colonial produce trade in the future depends upon the ability of producers to compete against keen and well favored rivals in quality and price. The company will seek to make available for producers and shippers the most approved means for enabling them to participate, on a remunerative basis, in this trade to an ever-increasing extent."

In the light of experience there are portions of the foregoing which would now be modified, but it represented at the time the best scheme that could be devised on the basis of the information then available. The apathy of stockowners, the indifference of merchants, and the timidity of capitalists proved obstacles too great to be overcome. The promoters were in earnest, and some progress was made, but the company was never formed. A year or two elapsed, and during that period the demand for some establishment for dealing with perishable produce on its way from the farm to the refrigerating chambers of the ocean steamer became more and more apparent. An attempt on the part of the Hon. George Riddoch to promote private



Government Slaughterhouse, Dry Creek—Cooling Room, Loading Platform, and Skin Shed.

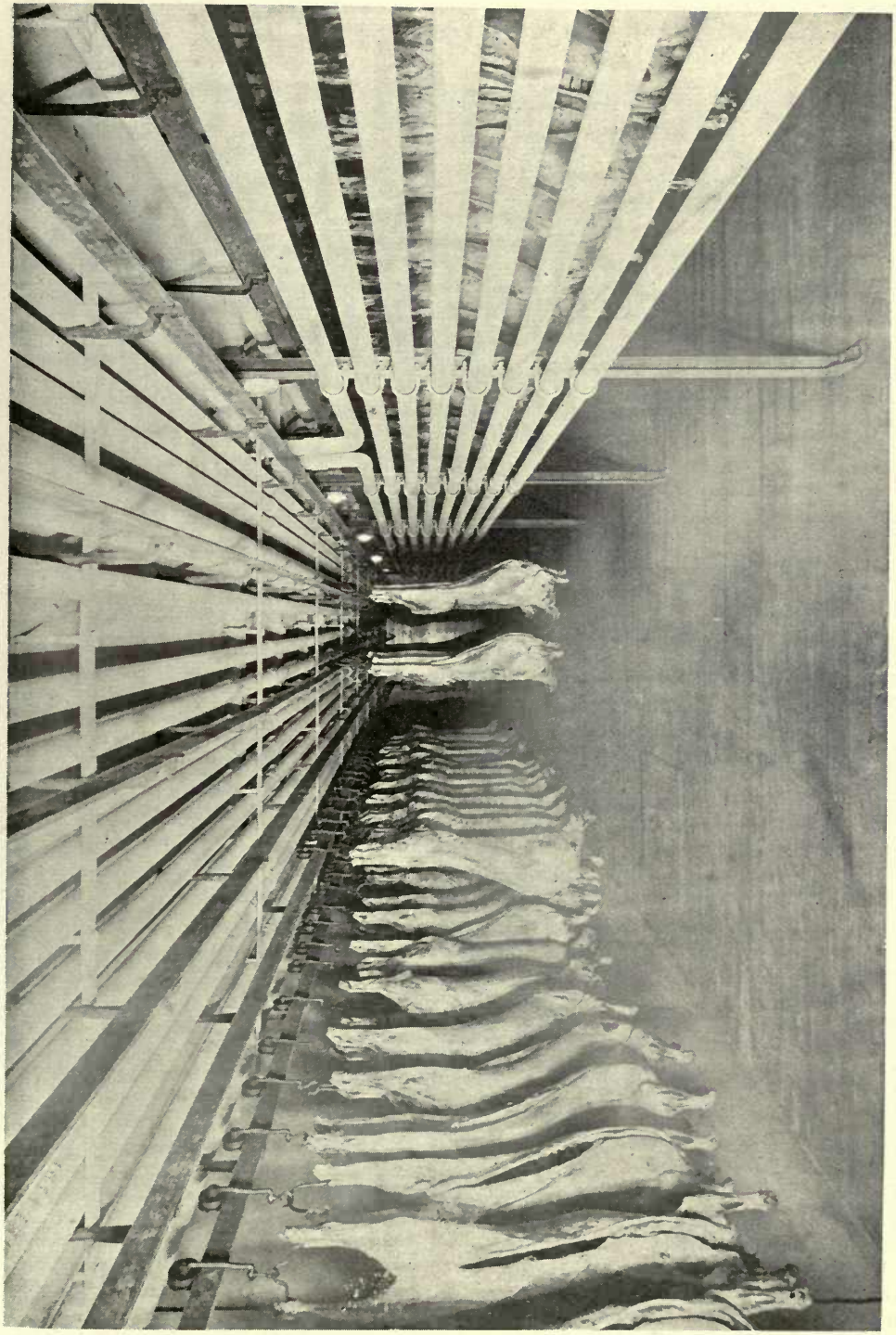
freezing works in the South-East met with no better success than did the efforts which had been put forward in the city. With private enterprise holding back—exhibiting indeed considerable scepticism—and producers demanding better facilities, the State stepped in and the Government Freezing Works were erected at Port Adelaide. These were opened in 1895, and they have been of immense advantage to producers and merchants. But for the establishment of these works the industry, which is now on a profitable basis, would not have been started for several years later.

At first the State Freezing Depot at Port Adelaide consisted of four insulated chambers for butter and a 6-ton "ice-making" J. & E. Hall's refrigerating machine. The building has a wharf frontage capable of berthing the largest steamer, and is situated at the end of Ocean Steamers' Wharf, Port Adelaide. The advantage of having such a wharf frontage, where frozen produce is shipped for export, is most apparent, and the condition in which cargoes of frozen meat are put on board ship is unequalled in Australia. In 1896 additional accommodation was provided, and a 12-ton Hall's refrigerating machine was installed. In December of 1897 Mr. R. W. Skevington took over the management. Early in 1898 still further additions were made, and the small 6-ton machine was replaced by an 18 tons Hall refrigerating machine. As will be gathered from the foregoing, the business was increasing, and a new slaughter-house, containing 18 butchers' tackles, was erected on the premises. In 1899, finding that freezing and storage accommodation were too small, further additions were made, giving a maximum freezing capacity of 1,500 carcases per day, and the storage room for 20,000 carcases. The business done by the department in 1899 showed the possibilities and advantages to this State of the lamb export trade. The local firms interested waited on the Government and successfully pointed out the importance of the Government still making large increased freezing and storage accommodation, and the following year a "Linde's" refrigerating machine was installed, bringing our capacity up to freezing 2,500 carcases per day, and storing upwards of 85,000 carcases.

The slaughter-house was removed from the Port works to Dry Creek, and the situation selected is near to the railway station and on the great Northern track route. The slaughter-house was built for the treatment of sheep and lambs, and is one of the best of its kind in Australia. It has tackles for 43 butchers, and with first-class tradesmen 4,300 lambs can be put through daily. After being slaughtered and dressed every lamb is weighed separately, and is then removed to the cooling room at the rear of the slaughter-house, where the carcases are hung on rails according to their grade marks. The distance between the slaughter-house and the Port Depot is about five miles per rail, and the carcases are carried in specially constructed louvred meat vans. The removal of the slaughter-house from the Port works could not be avoided, as there was no suitable land available ajoining the works.

This is the third season the department has killed at Dry Creek during all weather, and not one single carcase has shown deterioration in transit from the slaughter-house to the freezing works. Besides the handling of lambs and sheep for export from the homestead to the London market, including the receiving, slaughtering, freezing, shipping, and selling in London and disposal of skins and fat on behalf of clients, the department handles wine, butter, fruit, rabbits, and other perishable products, finding markets in England when persons so desire. The department claim that the plant and facilities for shipping at Port Adelaide are equal to anything in the States, and at Dry Creek the best provisions are made for drafting and slaughtering, and the utilization of all by-products for making tallow fertilizing manures.

In 1900, Mr. G. A. MacDonald, of Sydney, at a cost of £3,000, erected a freezing establishment in Adelaide, known as the Adelaide Ice and Cold Storage Company. The refrigeration is supplied by a 70-ton Hercules machine, of which Mr. MacDonald is the patentee. The Hercules has an excellent



One of the nine upstairs Freezing Chambers, Government Freezing Works, Port Adelaide.

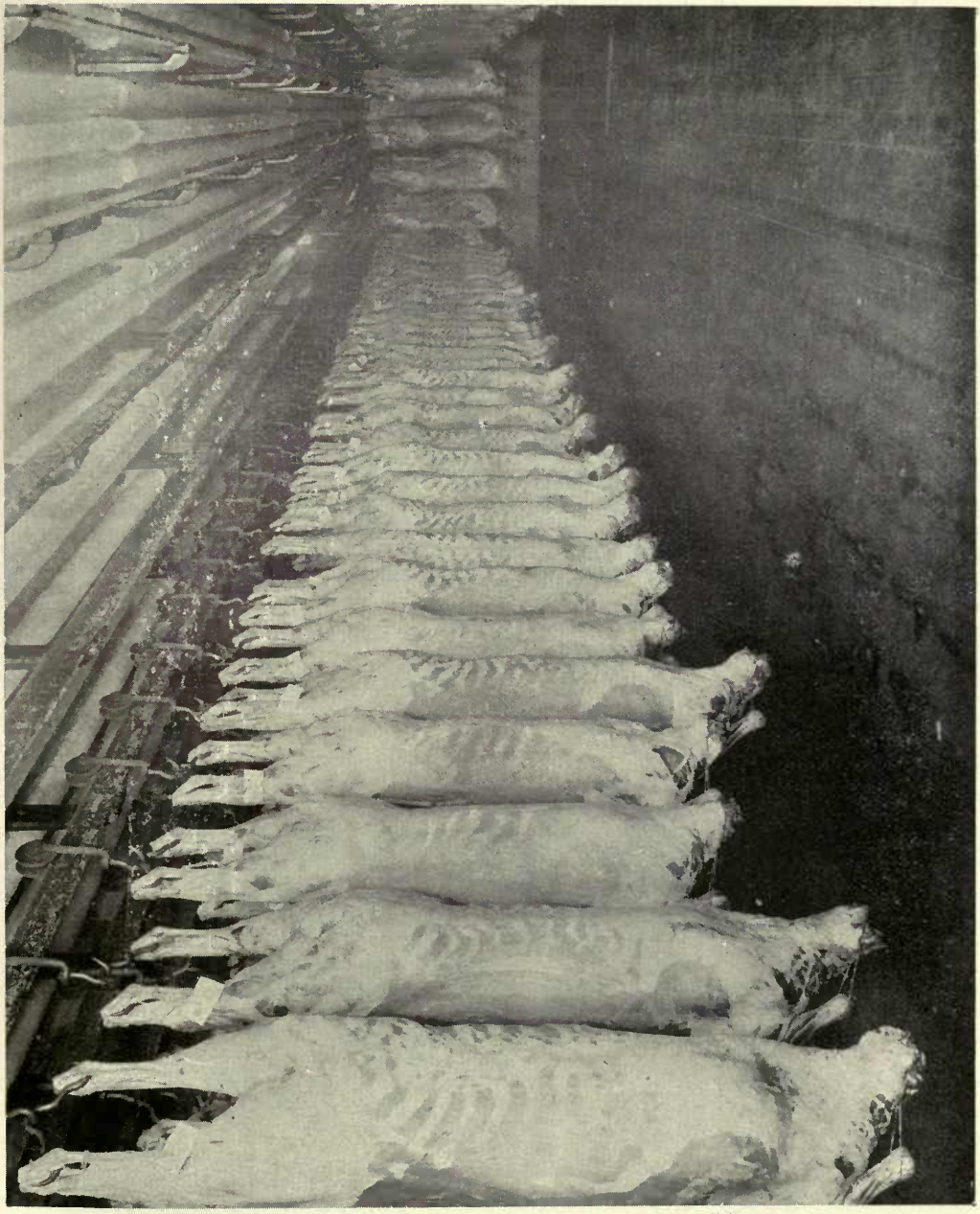
reputation, and the majority of the New Zealand freezing works are fitted up with similar machines, which are recognised as being the most up-to-date obtainable. In the eastern section are situated the boilers, engines, machinery, and ice-making plant. In the western section are the freezing chambers and stores, of a total capacity of 150,000 cubic feet. The intake during the present season is so great that it has been found necessary to make shipments at intervals of about 10 days in order to meet the increasing demands for refrigerating space. The lambs on arrival are removed to the top floor of the buildings by means of an electric conveyor at the rate of 800 per hour. They are then placed in the freezing chambers, bagged, and lowered to the store rooms below ready for shipment, from whence, when required, they are loaded out into vans at the rate of 1,500 per hour. Everything on the establishment is done with a minimum of handling, and exporters can readily see for themselves that on these works their produce is treated in the most up-to-date fashion. The fact that the present manager (Mr. H. Newman Reid) has practically spent his life in the study of refrigeration and cold storage, should inspire confidence in those doing business with this firm that their produce will have the scientific attention and care so necessary to the successful handling of perishable products. In addition to the actual freezing accommodation mentioned above, one of the lower stores is divided into 42 private compartments, which are let at a weekly rental to butchers, produce merchants, and others, who have liberty of access to them day and night. In connection with the freezing works there is an ice tank with a capacity of 21 tons of ice per 24 hours. The ice is manufactured from distilled water. A fish auction mart has also been established, and this has proved a great boon to citizens. A large trade is also done in freezing poultry for export and packing eggs in cold storage for shipment.

With these facilities existing and the interest shown in the trade by merchants who buy direct from breeders and take the risk of shipping, the export lamb trade has been firmly established. The growth of the industry is shown in the following records of shipments of frozen lamb and mutton :—

Year.	lb	£
1898	963,763	13,602
1899	2,586,726	36,289
1900	4,267,664	65,085
1901	3,326,085	58,477
1902	4,859,937	80,927
1903 (estd.)	6,000,000	110,000

It is expected that during the present season—the export period lasts from, say, August 1 to March 1—about 150,000 carcases will be sent away. The profitable nature of the business to the grower may be gathered from the fact that lambs are marketable when they are about 16 weeks old. At the present time well-bred lambs are worth 16/ a head in the Adelaide market. Instead of being uncertain as was the case a few years ago, as to what his animals would fetch up to a maximum of 7/ each, the breeder now knows that he has a sure outlet for well-grown lambs at several shillings per head advance on that as a minimum. To the original objection that breeders would not be able to provide sufficient drafts of stock to warrant the erection of freezing works, the actual experience is that the guaranteed demand has created a steadily increasing supply. It is this fact which effectually silences those who at intervals complain that the exportation of lambs makes "dear mutton" for the local consumer and delays the restocking of idle country. If it were not for the regular outlet at a payable price the lambs would not be produced. Besides, crossbred ewe lambs now exported would not be suitable for breeding purposes if retained.

A favorite cross with farmers for the production of an early maturing lamb is the Shropshire-Merino. A typical lamb most favored by exporters is one weighing about 35 to 38 lb., and about four months old. The Tasmanian Shropshire Flock Book has prepared the following "points of excellence" in a typical animal :—Constitution and quality 25, indicated by the form of body; deep and large in breast, and through the heart; back wide, straight, and well covered with lean meat or muscle; wide and full in the thigh, deep in flank, skin thick but soft, and of a pink color; prominent brilliant eyes and



A Freezing Chamber, Adelaide Ice and Cold Storage Company, Light Square, Adelaide.

healthful countenance. Size, 10; in fair condition; when fully matured, rams not less than 225 lb., ewes not less than 175 lb. General appearance and character, 10; good carriage; head well up; elastic movement; showing great symmetry of form and uniformity of character throughout. Body, 15; well proportioned; medium bones; great scale and length; well finished hind quarters; thick back and loins; twist deep and full; standing with legs well placed outside; breast wide, and extending well forward. Head, 10; short and broad; wide between the ears, and between the eyes; short from top of head to tip of nose; ears short, of medium size; eyes expressive; head should be well covered with wool to a point even with the eyes, without any appearance of horns; color of face, dark brown or soft black. Neck, 5; medium length; good bone and muscular development, and especially with the rams; heavier towards the shoulders; well set up and rising from that point to the back of the head. Legs and feet, 10; broad, short, straight; well set apart; well shaped; color, dark brown, and well woolled to the knees. Fleece, 10; body, head, belly, and legs to knees well covered with fleece of even length and quality; scrotum of rams well covered with wool. Quality of wool, 5; medium; such as is known in American markets as "medium delaine," and half combing wool; strong, fine, lustrous fibre, without tendency to mat or felt together; and at one year's growth, not less than 3½ inches in length. Total, 100.

Producers have tasted the sweets of a profitable branch of the export produce trade, and it is not likely that further opportunities of promoting it will be neglected. Certainly the same undercurrent of apathy and in some quarters active opposition which characterised the early days of the lamb trade are not likely to recur when new departures are suggested. Brains more than anything else are required in the development of the natural industries of Australia. The resources exist. In order to tap them and turn on a stream of prosperity into private and national channels, the primary producer and those who fill the gap between him and the consumer in the old world, must work intelligently and exhibit enterprise. Knowledge is power. It is also profit when properly directed in the by-ways of commerce. As a by-product of the farm lambs for export are proving highly remunerative, and the future of this steadily expanded industry is assured.

A Scene at the Mount Gason Artesian Bore.

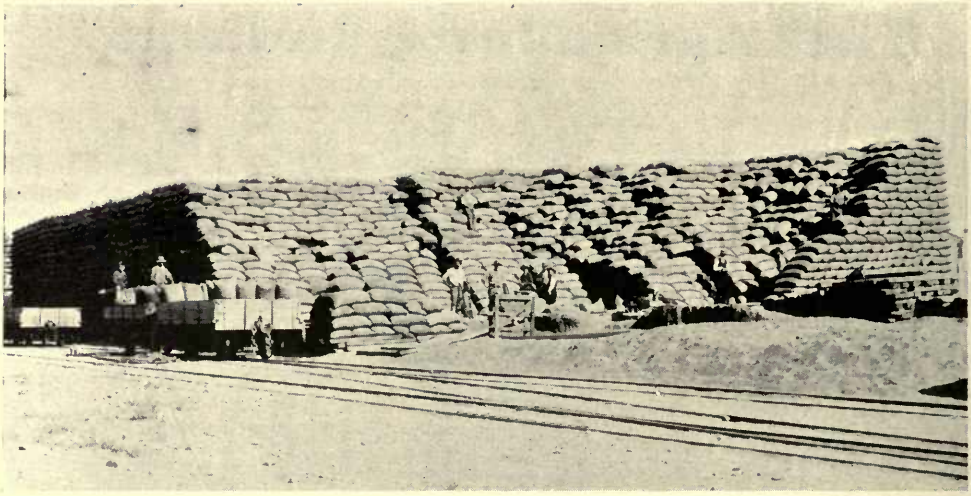
The Agricultural Industry.

For many years South Australia was known as the granary of Australia. That title was legitimately earned, this State having been the first of the Australian group to export breadstuffs on a large scale. At the outset the pioneers hung about the city fearing to break away from the companionship of shipmates—doubtful if the land available would repay cultivation. For some time a wrong impression prevailed concerning the quality of the soil on the Adelaide plains. Even Captain Sturt was misled by the parched appearance of the country. When delivering a lecture to the settlers in 1838, he remarked: "If you attempt to cultivate the land around Adelaide you will be grievously disappointed. You must not expect to get crops of grain or fruit on this side of the ranges." Within three years of the delivery of that address sections on all sides of the city were yielding 30 and 40 bushels of wheat to the acre! Breadstuffs were imported from Tasmania, and at one time flour was sold up to £100 per ton in Adelaide. Cereal growing was a pronounced success from the start, and in this branch of industry progress continued by leaps and bounds for many years. The population, exclusive of Northern Territory, shipping, and aborigines, in 1891 was 310,426, and at the census of 1901 had increased to 354,001, an addition of 43,575 persons, or 14 per cent. During the same period the area under cultivation had increased from 2,649,098 acres to 3,279,406 acres, an addition of 630,308 acres, or 24 per cent., as compared with an increase of 3 per cent. during the preceding decade, 1882-91. There were 9.0 acres of tilled ground per head of the population, as compared with 8.4 acres at the date of the census of 1891. The following table shows the area under cultivation in each division in South Australia at the date of the census of 1881, 1891, and 1901 respectively, and the increase or decrease, respectively:—

Division.	1881.	1891.	1901.	Increase or Decrease. 1891 on 1881.	1901 on 1891.
Central	931,783	894,593	1,152,340	− 37,190	+257,747
Lower North ...	822,615	967,627	980,536	+145,012	+ 12,909
Upper North ...	699,391	665,479	841,036	− 33,912	+175,557
South-Eastern ...	90,313	73,085	97,784	− 17,228	+ 24,699
Western ...	29,802	48,314	207,710	+ 18,512	+159,396
Total ...	2,573,904	2,649,098	3,279,406	+ 75,194	+630,308

The following statements shows the area of the State, also of the several divisions referred to, of the land wholly or conditionally alienated, of Crown leases, and of the total occupied:—

	Area. Sq. Miles.	Area. Acres.	Occupied. Alienated. Acres.	Occupied. Crown Leases. Acres.	Occupied. Total. Acres.
I. Central Division ...	13,891	8,890,240	3,203,909	3,397,138	6,601,047
II. Lower North ...	12,401	7,936,640	2,453,036	3,902,799	6,355,835
III. Upper North ...	14,065	9,001,600	905,806	7,414,709	8,320,515
IV. South-Eastern ...	15,585	9,974,400	1,348,252	4,146,428	5,494,680
V. Western	24,511	15,687,040	176,773	6,049,756	6,226,529
Total Counties ...	80,453	51,489,920	8,087,776	24,910,830	32,998,606
Remainder of State ...	299,617	191,754,880	1,121	60,666,325	60,667,446
Total South Australia	380,070	243,244,800	8,088,897	85,577,155	93,666,052
Northern Territory ...	523,620	335,116,800	473,278	112,654,288	113,127,566
Grand total ...	903,690	578,361,600	8,562,175	198,231,443	206,793,618



Building a Stack of Wheat at a Shipping Port.

South Australia, exclusive of the Northern Territory, has an area of 380,070 square miles, or 243,244,800 acres, of which 93,666,052 acres are in occupation, 8,088,897 acres have been alienated, and 85,577,155 acres are held under lease from the Crown, the remaining 149,578,748 acres being open for settlement. Forty-six counties have been proclaimed, including the more closely-settled portions, representing 80,453 square miles, or 51,489,920 acres. Of the total area 8,087,776 acres have been wholly or conditionally alienated, of which 553,773 acres are held by 1,404 selectors on the deferred payment system. Of the remainder, more than half, 24,910,830 acres, is held under direct lease from the Crown for agricultural or grazing purposes, or both combined. "Showing the extension of the leasing system for purposes of farming and grazing," says the Government Statist, "instead of the State parting with the freehold, it will be noted that 20,485 leases have been granted, of which the area under 8,429 right of purchase leases is 5,580,676 acres, under 5,168 perpetual leases 7,143,283 acres, and under 3,695 miscellaneous leases 3,904,960, together 16,677,175 acres, inclusive of 3,913 homestead blocks and leases, having an area of 48,256 acres. The area occupied for pastoral purposes only is 68,915,840 acres, under 536 leases. The Renmark Irrigation Colony, together with the village settlements on the River Murray, cover 76,900 acres. The proportion of land occupied under Crown leases for settlement is nearly three to one held under freehold. The receipts from the sale of Crown lands, which in times past formed a considerable portion (for many years one-fourth) of the general revenue, only average £40,725 per annum, mainly completions of purchase of land held on the deferred payment system. The receipts from Crown lands form 7 per cent. of the total revenue in South Australia, 15 per cent. in Queensland, and 21 per cent. in New South Wales.

Beyond the limits of agricultural settlement 107,681 square miles, or 77,794,560 acres, are held by 536 Crown lessees as sheep or cattle runs. The rental accruing in 1902 was £35,747, as against £37,068 the year before. When the system of credit selection was introduced in 1870, the sale by auction of land in fee simple was practically suspended. A further radical change was effected by the Crown Lands Act of 1888, which in its turn abolished credit selections on deferred payments, and substituted in lieu thereof a system of leasing. Agricultural lands were subsequently leased on a right of purchase system, or, as an alternative, perpetual leases. Parliament has recently passed legislation abolishing right of purchase, and substituting a covenant to purchase by means of sixty

S. J. Dailey photo. *Hay-Making—A Heavy Crop.*

half-yearly instalments. Land legislation is now on a liberal basis, and the Crown is a good landlord. Small blocks in certain localities, chiefly near centres of population, are also open for leasing by working men in lots not exceeding twenty acres, and upon similar tenure. In these cases personal residence of the lessee or a member of his family is required. Leases with right of purchase, which is exercisable after six years' tenure, are allotted for a term of twenty-one years, with right of renewal for a further like period. Land under perpetual leases will be re-valued by the land boards every fourteen years. The lands are classified and the rents and prices determined by these boards, but the right of purchase may not be exercised at a less price than 5/ per acre.

The system of leasing Crown lands at one time in favor has now been abandoned in favor of a plan whereby the tenant may obtain the freehold. Taking the freeholds and Government leaseholds jointly, the average area occupied by each individual of the population is about seventy acres. This is exclusive of pastoral lands. In 1844, 2,687 acres were under cultivation, 1860, 428,816 acres; and 1880, 2,574,000 acres. The following shows the extent of land in occupation, cultivated and uncultivated:—

Year.	Land Alienated.	Extent of Land held by Freeholders.	Land Enclosed.	Land under Cultivation.	Land Enclosed but not Cultivated.
	Acres.	Acres.	Acres.	Acres.	Acres.
1884-5	10,335,572	5,893,632	53,444,411	2,785,490	50,658,921
1889-90	9,094,918	5,662,741	59,972,020	2,864,887	57,107,143
1890-1	8,532,823	5,562,542	61,365,069	2,649,098	58,715,971
1891-2	8,593,894	5,770,040	64,680,362	2,533,291	62,147,071
1892-3	8,637,947	5,732,615	64,174,971	2,625,741	61,549,230
1896-7	8,670,530	5,764,054	—	2,584,395	—
1897-8	8,034,803	6,087,495	—	2,604,122	—
1898-9	8,055,069	6,413,267	—	2,967,370	—
1899-1900 ...	8,056,890	6,619,684	—	3,081,846	—
1900-1	8,073,814	6,086,462	—	3,279,406	—
1901-2	8,088,897	6,375,820	—	3,122,800	—

Harvesting—A Mid-day Halt.

Farming on a large scale in the Middle North. Harvesting a big grain crop. Over fifty strippers are at work in the one field.

With reference to the column headed "land alienated," it should be explained that the figures previously to 1897 included lands granted for educational endowment, dedicated for forest reserves, &c., but now leased. The "cultivated area"—the true test of agricultural progress—is steadily expanding, and as large estates in favored localities are being purchased by the Government or private persons and cut up into small holdings suitable for farmers, the area under cultivation will continue to increase. There is room for considerable development, more particularly in the South-Eastern portions of this State, regarded by competent authorities as "the New Zealand of Australia." "One of the lessons taught by the late drought," says the Government Statist, "has been to impress upon farmers that, even in dry seasons, careful husbandry and the adoption of modern systems will ensure returns for their labor otherwise unobtainable. Utilising sheep in the stubbles and on the fallows, thereby clearing the land of wild oats and noxious weeds, is very general, as also is early sowing with the aid of the drill, depositing such chemical manures as are required by the soil to produce good and clean crops of superior grain. Ground so husbanded has yielded more than double the return in frequent instances, both of wheat and hay, and conduces to the fuller development of the staple products of the country, and consequently to the additional value of real estate. Not many years ago the use of artificial manures was, except to a few, unknown on farms; at present about 1,000,000 acres, or one-half of the entire crop, is so treated."

From 20 acres sown in 1838 the cultivated area was gradually extended until 15,000 acres were put under wheat in 1842. For the first time South Australia was able to produce sufficient grain to provide for home consumption and begin an export trade in breadstuffs, which was destined to grow into a profitable industry. Countries which had hitherto supplied flour at £100 per ton were now able to purchase the South Australian article at a tenth of that price. From that time onwards breadstuffs were exported, and by degrees valuable business connections were established with other States, South Africa, Java, China, and Eastern ports generally. The steadily growing demand from these customers and the distance have prevented large exportations of flour to the United Kingdom. Consignments have been made from time to time, and the highest praise has been bestowed upon the quality of the South Australian article. Results, however, have seldom been so profitable as to encourage the miller to repeat the experiment. From a few tons in the early forties exports grew until in 1884 the highest point was reached, when breadstuffs to the value of £2,500,000 were shipped away. An initial error made by the pioneer agriculturist was an attempt to transplant English methods of farming. Original blocks of 80 acres were surveyed, but it was not long before these "garden plots" were found to be quite inadequate to support a family with wheat as the only product. Then the pendulum swung the other way, and in some instances farms held by one person became too large in the best interests of the country, and often for the good of the owner. The ambition of the tiller of the soil was to be able to point to large fields of waving corn—to carry on his operations on an extensive scale. Quality was often sacrificed for quantity in the desire to cultivate a maximum area in a minimum period. Thus it came about that prosperity in agricultural centres was wont to be measured by the acreage sown. All this, however, belongs to the past, and methods of farming are not now the subject of reproach that they were twenty years ago. The acreage cultivated means far more in South Australia to-day than an equal area did fifteen, or even ten, years ago. In other words, the productive capacity of the farming country has been steadily increased until our people are able to better understand what "intense culture" means. Said Professor Lowrie (till recently head of the State Agricultural College):—"If we get a return to one of our normal years the wheat acreage of South Australia, with the attention farmers are giving to manuring, will be raised to a degree that even the most sanguine scarcely expects. In a relatively few years we will find the wheat average in this country somewhere about eleven or twelve bushels to the acre, and it will involve very little more work than at present."

W. S. Smith photo. *Harvesting, Stripping, and Winnowing Grain.*

The old order of farming gradually gave way—under the pressure of low prices and dry seasons—to systems which are safer and more profitable. At one time when the grain crop failed the farmer starved, took a fresh mortgage—if he could obtain it—or begged from the Government. The modern tiller of the soil aims at diversity, and is not so dependent upon one source of revenue. There are still a number of producers who are wheatgrowers, and that only, "carrying all their eggs in one basket," but their ranks are rapidly being reduced. The tendency to lean on the Government is not so pronounced as it was a few years ago, and the progressive grain grower owns a small flock of sheep, and is interested in the fluctuations of the wool market and in the export lamb trade.

In no direction has the evolution been so marked as in the improvement of agricultural machinery. Twenty years ago the farmer trudged behind a single or double-furrowed plough. To-day he rides on a four, five, or six-furrowed implement! The pioneers reaped their first crops with sickles. Then came the Ridley reaper, a wonderful invention. This machine underwent frequent changes. Scarcely a year went by without some improvement having been made, until the farmer now has a wide variety of choice—the light draught pony stripper; the damp weather machine; the complete harvester which threshes, cleans, and bags the grain; or there is the combined mower and binder with the header to complete the process. Another great influence on the progress and prosperity of agriculture in South Australia has been artificial manures. Until a few years ago it was not considered necessary to return to the soil any of the properties taken from it. At the present time it would be difficult to find a man sceptical of the advantage of applying science in the direction of artificial fertilisers, and this season over a million acres have been manured. Lands which were regarded as worthless are now producing heavy crops of hay or grain.

The farmer is often conservative in thought and action. He clings to methods with which he is acquainted on the principle that it is wise to "hold fast that which is good." After Captain Sturt's opinion of the Adelaide plains had been falsified, it was confidently asserted that cereals would not grow a few miles further north. This was also proved to be a mistaken notion. The early sheepfarmers clung tenaciously to the land secured by them, but gradually they had to make way for the

Harvesting a 10 ft. Maize Crop with Mower and Binder on the Markaranka Irrigation Co.'s Farm near Morgan, River Murray.

agriculturist who was lured on until, some think, he has at last gone beyond the line fixed by Nature. It should not be assumed, however, that the limit of production has been reached—that there is no more land available that is fit for cultivation. Such is not the case. In addition to the natural process ever at work, by which large estates come into the market automatically, the Government has power to purchase large holdings and subdivide "for purposes of closer settlement." In the South-Eastern divisions of the State drainage works have greatly multiplied the fertility of the soil, and an extension of this system is now making available a large area of Crown lands which, without drainage, would be useless swamps.

A few years ago Millicent—a typical centre of the drainage area—was little better than a swamp, with here and there a hillock modestly raising its head out of the water, generously offering itself as a perch for the wildfowl to rest upon. The land when not so covered was sour and irresponsive to the persuasive devices of the cultivator. The town was small, and nothing ever happened to disturb the peaceful meditations of a somnolent people. To-day Millicent hums. There is a whirr and buzz everywhere you go. Out on the lowlands where rank grass used to grow you can get up to your knees in a lucerne patch or a rape crop. Where a mower and binder has been at work for a week an army could be hidden out of sight behind the stooks of hay, which stand close together, and are eloquent of the large yield which the paddock has produced. There are root crops as well as grain crops grown on the farms, lambs are being bred for the export trade, and more attention is now devoted to dairying. The more one sees what has been done the more impressed one becomes with the possibilities of this country. It is no reflection on the settlers to say that they have yet to realise the full extent of the natural resources of the district. Some of them have only begun to discover the capa-

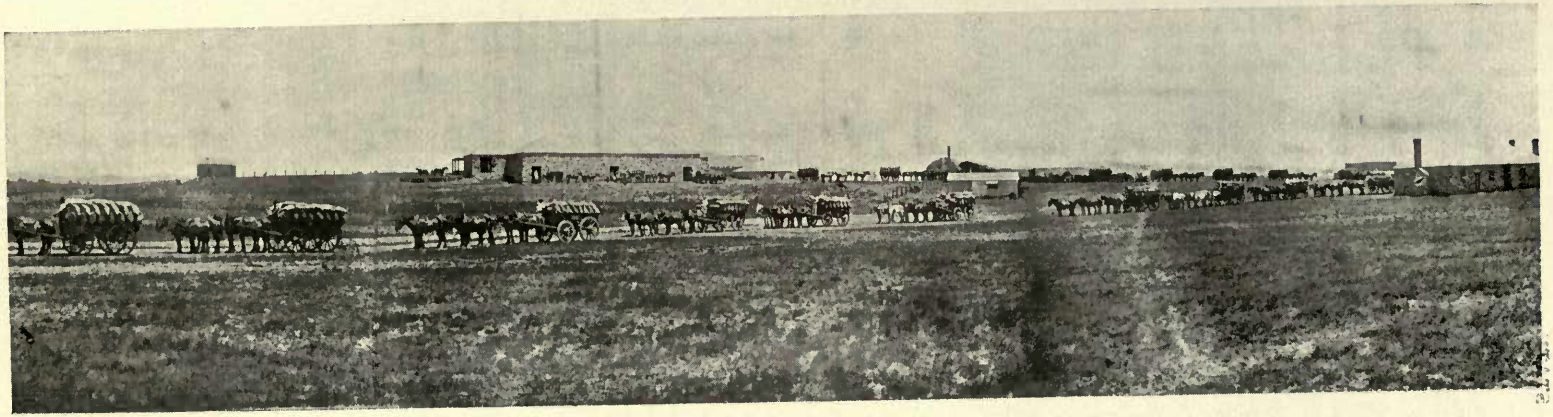
bilities of their land—a few will not live long enough to do that, but those who take their places will find it out. Few problems have so exercised the minds of past and present legislators than the question of draining the lands of the South-East, and yet it seems one of the surest and most profitable investments in which public money can possibly be employed.

Drainage applied to the swamp lands adjacent to the River Murray has produced marvellous results. Mr. Allan McFarlane, of East Wellington, spent £10,000 on an embankment to reclaim 700 acres which now carries six sheep to the acre. A neighbour, Mr. H. W. Morphett, of Wood's Point, reclaimed 650 acres at a cost of £6,500. Five acres under onions yielded 30 tons per acre; the barley crop returned 42 bushels per acre; and the lucerne crop gave five cuttings in one season. Irrigation has become a significant factor in the agricultural industry of South Australia. In addition to the irrigation colony at Renmark, which will be dealt with separately, settlements are steadily multiplying in the valley of the Murray. What within the memory of young men was a wilderness—barren, inhospitable land or swamps covered with useless rushes—is being made productive. The transformation scene has been worked so quietly and quickly that few people realise what the change really signifies. It is materially affecting the producing strength of South Australia. There are also large areas of virgin land in the midland districts which will one day be available for cultivation, and when that takes place production will progress on a still higher plane.

The climate and soil of the southern portion of the State are eminently adapted to agricultural pursuits. Every variety of fruit and vegetable and the highest quality cereals are successfully raised in the vicinity of Port Augusta, distant 260 miles north of Adelaide. In the South-Eastern districts—300 miles south of the city, are some of the finest gardens in Australia. Potatoes and onions are the chief products of this part of the State, and every variety of grain is successfully grown. There are two oatmeal factories at Mount Gambier which deal with the surplus oats grown in that prolific district. There is at least a stretch of country 500 miles long by an average of 60 miles broad wherein agricultural pursuits of every description can be followed. Beyond this limit wheat can be grown, but the experience of the last few years has shown that the farmer who goes too far out takes great risks. The tendency is more towards grazing than grain cultivation in remote parts of the State.

The agricultural lands of South Australia hug the coast-line. So pronounced is this that the furthest grain-producing district inland is well within 100 miles of a shipping port. The average distance of grain transport by rail is less than 50 miles. The importance of this fact should be apparent to the most casual observer. It means cheapness of transit to the seaboard, thus materially reducing the cost of the grain by the time it is afloat. There are few countries in the world better situated in the matter of climate, soil, and machinery for the cheap production of grain and proximity of the cultivated territory to the seaboard is a great factor when prices are governed—as they always are when there is a surplus available for export—by Mark Lane.

The agricultural industry is firmly established. The farmer has become more progressive. Certainly he is more responsive—quick to note the demands of the market, and more amenable than his father was to the requirements of distant customers. Science is proving a mighty industrial lever opening portals previously closed against the Australian producer. The modern wheat grower knows the strength and weakness of his soil, and he supplies deficiencies by employing artificial manures. By the use of the best machinery he seeks to reduce the cost of production, whilst he takes advantage of by-products that his predecessor kicked on one side or threw on the rubbish heap. Scientific and economical methods characterise the management of other branches of agriculture until golden mile posts are being firmly placed along the highway of industrial progress in South Australia. Droughts have been experienced which threatened disaster. Prices at one time fell so low that ruin stared the rural producer in the face. The future looked



Carting Grain to Market.

Winnowing.

A Crop of Onions, the property of Webster Bros., Mt. Gambier.

dark and dismal—hopeless. All this has passed away. "Sick" soil is recuperated, falling markets are met by reductions in the cost of cultivation. There is no despair among the rural producers of our State to-day, and there is no cause for any, for the bulk of our producers were never in a more prosperous condition than they are at the present time. To the man of intelligence, energy, and a little capital there is practically no limit to the exercise of his resourcefulness. The capabilities of the country are gradually becoming known and appreciated, and the term "farming" means more than it did ten years ago. This fact cannot be better illustrated than by showing the acreage under different cereals and the various agricultural produce raised. The following table shows the total area of land under cultivation in South Australia, the 10-year comparison proving that, in spite of exceptional seasons, producers have had the pluck to go forward:—

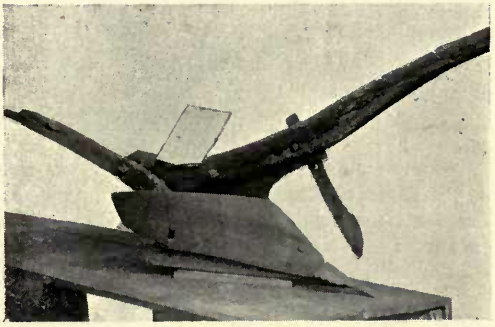
	Acres. 1892-3.	Acres 1901-2.	Acres. 1902-3.
Wheat	1,520,580	1,743,542	1,746,842
Hay	434,116	369,796	325,789
Barley	13,285	15,517	21,493
Oats	15,745	34,660	50,296
Fallow	567,878	862,738	888,946
Total cereals	2,551,604	3,026,163	3,033,466
Potatoes	6,014	6,248	7,763
Peas	4,705	4,938	5,452
Green forage	27,999	37,205	38,573
Garden	5,853	9,005	9,489
Orchard	9,918	16,315	17,376
Vines	15,418	20,860	21,692
All other	4,230	2,066	3,464
Totals	2,625,741	3,122,800	3,137,175

Compared with 1901-2 last season's acreages showed the following increases:—Wheat, 3,390 acres; barley, 5,976 acres; oats, 15,636 acres; peas, 151 acres; potatoes 1,515 acres; hay (decrease), 44,007 acres. Green Forage.—Wheat, oats, or barley (decrease), 37,642 acres; lucerne (decrease), 76 acres; sown grasses, 1,318 acres; other crops, 1,398 acres; fallow, 26,208 acres; garden, 484 acres; orchard, 1,061 acres; vines, 832 acres.

From the area devoted to the various industries it will be interesting to turn to the actual production of the State, and again it will be well to take a 10-year period. The following is the comparison:—

	1892-3.	1902-3.
Wheat, bus.	9,240,108	6,354,912
Hay, tons	389,277	308,825
Barley, bus. ...	175,468	317,155
Oats, bus.	166,489	620,823
Peas, bus.	69,922	89,654
Potatoes, tons ...	20,057	28,312
Almond trees ...	111,607	165,255
Almonds, cwt. ...	3,388	5,699
Orange trees ...	73,365	127,762
Oranges, cases ...	43,817	62,814
Lemon trees ...	—	67,557
Lemons, cases ...	—	27,057
Olive trees ...	48,252	78,642
Olive oil, galls. ...	2,291	12,422
Hives of bees ...	22,142	18,731
Honey, lb. ...	412,886	756,822
Vines, bearing ...	4,206,880	10,067,139
Not bearing ...	4,545,737	1,723,787
Grapes sold, cwt. ...	72,798	235,948
Wine made, galls.	594,038	2,145,525
Currants dried, cwt.	—	4,886
Raisins made, cwt.	711	11,562
Butter, lb. ...	3,110,093	4,521,246
Cheese, lb. ...	661,314	705,969
Wattle bark, tons	3,131	9,212

It should be explained that the figures relating to wine refer to the vintage of the previous year, but do not include the wine made from grapes sold to winemakers who are not also growers. The above comparison reveals a most gratifying expansion of rural industries. Compared with 1901-2 last season's production underwent the following increase:—Wheat, 1,657,850 bushels (decrease); barley, 73,793 bushels; oats, 151,569 bushels; peas, 7,923 bushels (decrease); potatoes, 13,253 tons; hay, 37,642 tons (decrease); almonds, 660 cwt.; oranges, 4,448 cases; lemons, 12 cases; olive oil, 1,095 gallons; wattle bark, 646 tons; honey, 446,769 lb.; raisins made, 4,222 cwt.; currants dried, 1,473 cwt.; butter, 433,277 lb. (decrease); cheese, 347,191 lb. (decrease). Last season there were 98 silos, with a capacity of 79,080 cubic feet, in the State, compared with 87, of 146,640 cubic feet, in 1901-2.



The First Plough used in South Australia.

At the time of going to press, the prospects of the approaching harvest are extremely bright. Record crops of all descriptions are confidently forecasted, and fears are entertained that there will be a block on the railways owing to the unprecedented demands to move grain and other produce to the seaboard.

Aids to Agriculture.

Before passing on to a review of the various industries which come, naturally, under the head of agriculture, it will be interesting to briefly refer to a few potent "aids" to farming. There is the influence which artificial manures have had in restoring fertility to over-worked soil; whilst no reference to the agricultural industry would be complete which omitted to direct special attention to the remarkable evolution in farm machinery. South Australia has led the way in both. The stripper was invented in this State, and has been perfected here. Similarly, the stump-jumping plough, which has been the means of revolutionising farming in the scrub lands of Australia. Just at a time when it seemed as if the agricultural industry had got into a blind alley—as if the limit of production had been reached—science came upon the scene and provided a key capable of fitting every lock. Unknown portals flew open and showed a cleared passage where apparently insurmountable obstacles had previously blocked all progress. To Mr. Molineux—at that time agricultural editor of the Adelaide Observer—great credit is due. He was the first man to preach the gospel of hope to the rural producers. He did more than preach; he demonstrated and proved. It was Mr. Molineaux who founded the Agricultural Bureau system promoting experiments which lead to the introduction of so many improvements in the growing of cereals, and in fruit culture. One success led on to another, so that from having been a class of sceptics, rural producers took a pride in adopting new methods. Science continues to be a mighty lever in agricultural fields, and it is only those who are ignorant of the forces at work who doubt the future of the rural producer in these lands. No Australian State has a better agricultural record, while in South Australia the cost of production is lower than elsewhere.

Fertilisers have had an important influence on the fortunes of producers. They have helped more than anything else to bring about a revival in agricultural pursuits. Constant cropping had exhausted the soil. The farmer in many parts sowed but reaped not, and the average production of the State began to suffer. Fallowing was resorted to in order to check the decline. There was a recovery, but not sufficient to compensate for the rapid decline which took place about the same time in the price of wheat. The position became critical, but the dawn followed the darkest hour in the agricultural history of the State. In 1879 an Experimental Farm and Agricultural College were established at Roseworthy, distant some 30 miles north of the city. Professor Custance was the first Principal, and in his first report he stated:—"Perhaps the most important result is the beneficial effect of bonedust and guano, 5 cwt. of each, which produced 26 bushels per acre. Should this result be confirmed next season it would indicate the value of phosphates and nitrogen in increasing the wheat crop. Probably mineral phosphates and nitrate of soda may be found in the colony. If so, by means of the application of about 1½ cwt. of nitrate of soda and 5 cwt. of phosphates per acre on well cultivated lands, the yield of wheat may be increased considerably, in many districts as much as 50 per cent." In his next report, 1883, Professor Custance wrote:—"Wheat may be grown year after year on the same land under certain conditions with profit to the farmer, one of the conditions being a cheap supply of suitable manure—that is, manure containing the ingredient deficient in the soil and required by the wheat plant, which proves to be phosphoric acid." In 1885 the same authority wrote:—"Some important facts will be noticed, notwithstanding the unfavorable season, such as the yield of 22 bushels per acre from 3 cwt. of superphosphates. . . . The quantity of superphosphates used, viz., 3 cwt., costing, at 4/ per cwt., 12/ per acre, should induce

Golden Grain ready for Shipment—Scene on a Wharf at Port Pirie.
G. A. Ball photo.

farmers to give this manure a fair trial. After numerous experiments carefully conducted during the last four years, I can strongly recommend superphosphates as the cheapest and best manure for the wheat crop." Professor Lowrie, who succeeded Professor Custance at the Agricultural College, enthusiastically worked along the same line, and did yeoman service to the State. In 1894 he put the following opinion on record:—"The phosphatic manures are found specially suitable under our South Australian conditions. The practice of bare fallowing and the absence of under drainage and summer leaching of the nitrates in the soil are the means of maintaining a relatively high proportion of nitrogen in the soil, and experience is leading us more and more to the use of phosphatic manures in relatively high proportion compared with nitrogenous manure. Speaking generally, it is more from deficiency of phosphates than any other element of plant food that our average wheat yield in the colony is so unfortunately and discreditably low." In a paper read before the Agricultural Bureau Congress in 1896, Professor Lowrie observed:—"The phosphatic manures are the most beneficial in the first instance at least. In all districts where the rainfall exceeds 15 or 16 inches, I believe it will be found, if the cost of carriage of the manure be not prohibitive, that manures can be profitably used for wheat, and in all hay-growing districts I have not the slightest hesitation in saying that no practice open to us is more profitable as far as agriculture proper extends than the regular judicious use of artificial manures. For grain probably 1½ to 2 cwt. will be found a good useful dressing for an acre." Subsequently Professor Lowrie—in the light of further experiments conducted by himself—declared:—"We only want a good season to thoroughly establish the confidence our farmers now feel in the use of artificial manures. I am sure that with a fair season the wheat average will be nearly double what it would have been had the practice of farmers been what it was eight or ten years ago."

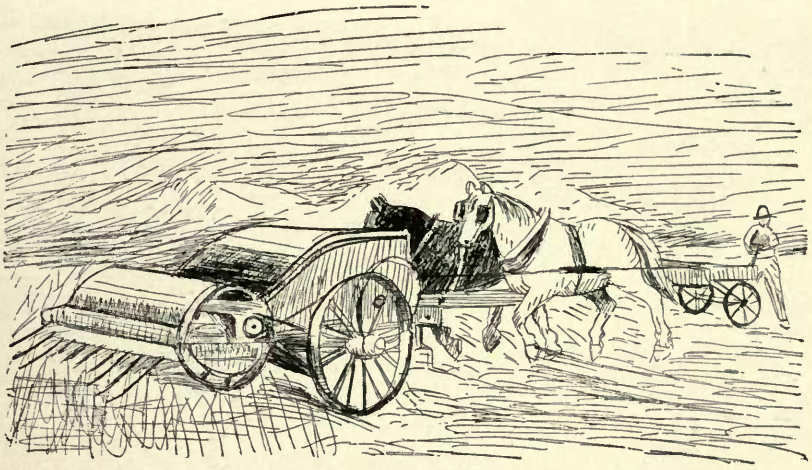
Whilst this educational process was at work at the Agricultural College, enterprising farmers were supplying practical demonstrations. Farmers on Yorke's Peninsula led the way, and in no part of the State have fertilisers worked so wonderful a change. A few years ago land on Yorkes Peninsula which is now firmly held at £5 to £6 per acre, could not be sold at 25/ per acre. Artificial manure, and that alone, was responsible for the change in land values, and a corresponding movement has taken place in other parts of the State. In 1894 11 acres were drilled in with wheat and superphosphate to the extent of 90 lb. per acre. The result was satisfactory, and next year the area was extended to 200 acres. It is estimated that this year (1903) over 1,000,000 acres have been similarly treated! Importations of artificial manures have been as follows:—

	Tons.
1896	600
1897	4,600
1898	13,000
1899	16,000
1900	24,000
1901	31,000
1902	37,000
1903	44,000

In addition to these foregoing, guano and phosphates have been discovered in South Australia. A tempting bonus was offered by the Government to the discoverer of a payable phosphate mine, and this amount has been paid to a prospector on Northern Yorkes Peninsula. Several other phosphate claims are being worked, and there is every promise that payable mines will be found in South Australia. The introduction of fertilisers led to a largely increased demand for seed drills.

The machinist has ever been a good friend to the agriculturist. Early in the forties there was an agricultural crisis, and so serious did the position become that an official decree went forth prohibiting the exportation of wheat! From 4,000 acres under grain in 1841, the area under cultivation rose to 14,000 in the next year. The problem of harvesting the crop by means of the ancient sickle, and in the absence of a supply of laborers was apparently insolvable. Imperial soldiers then doing duty in South Australia were ordered—if not to actually turn swords into ploughshares and spears into pruning hooks—to go out into the fields and assist to gather in the harvest. Harvesting charges ranged up to £2 per acre. It was doubtful whether, in view of their experiences, landowners would sow wheat the following year.

The necessity of some contrivance to aid producers in harvesting having been made so apparent, a body called the "Corn Exchange Committee" took the matter up with zeal, and announced, through the columns of "The Register," that they would be prepared to give a reward for the best invention to be exhibited to the committee. Thirteen persons presented models and drawings of various machines, but the committee came to the conclusion that there was none which they were justified in recommending for general adoption. In the meantime, Mr. John Ridley, a miller, of Hindmarsh, who did not compete, built a working machine, on the principle of stripping the heads off the straw. He acknowledged his indebtedness for the idea to an article in an encyclopædia, in which was the cut of a machine used in ancient days on the plains of Gaul. This was at once a complete success. The machine was propelled by a pole from behind, the pole being supported on two wheels. Two horses did the work. Mr. Ridley presented the invention to the public, and got no profit out of it except a margin on the actual implements which he made and sold. Describing the first public trial of this stripper the late Mr. Francis Dutton said:—"One afternoon during the summer of 1843-4, some friends met in Adelaide and asked me to join them in their ride to a neighboring farm where Mr. Ridley's reaping machine, which they said both reaped and threshed the corn at the same time, was successful at work. It was not generally known at that time what the machine was, and, although we were all incredulous, we started to see with our own eyes how far the reports we had heard were correct. Presently we saw from several quarters other horsemen all steering to the same point. By the time we reached the farm a large 'field' had mustered to witness the proceedings, and there, sure enough, was the machine at work, by the agency of two horses and two men—one



The Ridley Reaper.

to guide the horses, and the other the machine! There was no mistake about it —the heads of the corn were threshed perfectly clean; and, a winnowing machine being at hand, the corn was transferred out of the reaping into the latter machine, and carts were ready to convey the cleaned wheat to the mill, two miles off, where the wheat, which an hour before was waving in the fields in all the lustre of golden tints, was by Mr. Ridley's steam-mill ground into flour. Never before was, perhaps, such a revolution in the appliances of agriculture caused as was done by this machine; success attended the very first trial of it, and during seven days it reaped and threshed the seventy acres of wheat of which the paddock was composed."

New hope was given to settlers, and agriculture progressed by leaps and bounds, the "area under wheat" being nearly doubled in one year. The late Capt. Bagot wrote a letter to "The Register" giving his experience of the machine in the following harvest, 1844. He said that he reaped a field of 39⅛ acres of wheat in nine days, and obtained 843 bushels of good clean grain. He figured out the cost thus:—

Two men with the machine, one to steer, and the other to drive, nine days, at 2/6 each ...	£2	5	0
Use of the machine at 2/6 per acre	5	0	0
Cost of stripping 843 bushels ...	£7	5	0

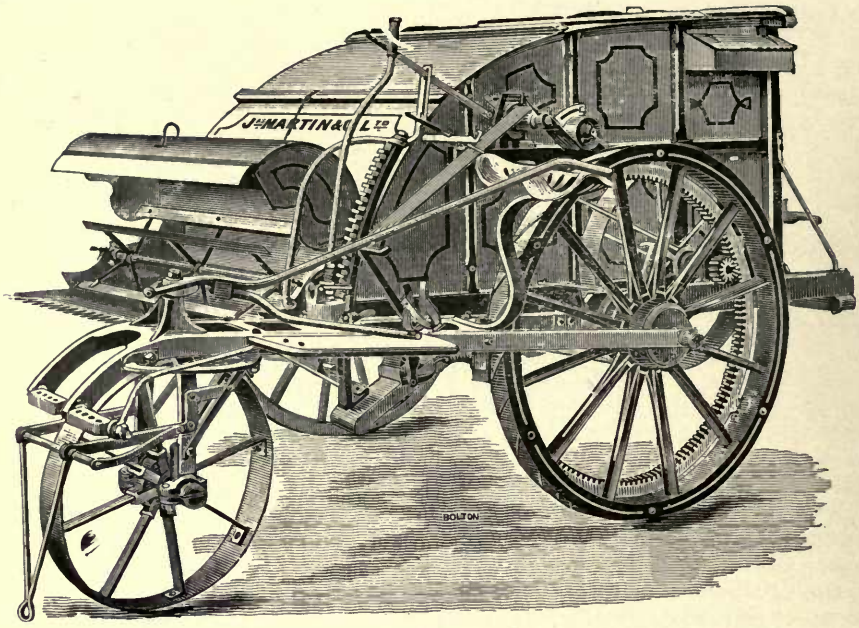
Or a little more than 2d. per bushel. Three men were employed for 12 days winnowing and carting in the corn to the store.

Three men, 12 days each, at 2/6	£4	10	0
Use of winnowing machine ...	1	0	0
Cost of winnowing	£5	10	0

Or less than 1½d. per bushel.

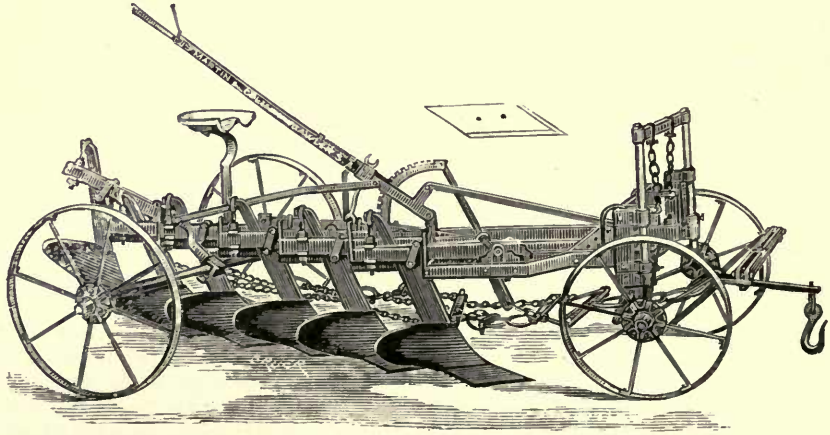
Thus the Ridley stripper at once reduced the cost of harvesting from 2/ per bushel to 3½d., or for a 20-bushel crop from £2 per acre to 5/10! No wonder Captain Bagot spoke of the "extraordinary value of Mr. Ridley's admirable invention!"

From the Ridley machine sprang the splendid strippers which are now to be seen all over Australia and the "complete harvester" at present commanding attention. In the fifties the late Hon. James Martin obtained £150 for the first reaper he made. To-day the greatly improved modern machine can be bought for a third of that price. The principle of propulsion from behind soon gave way to a side application of motive power. Then followed the thimble comb which prevented a loss of grain. A simplification of the machine enabled one man to steer and regulate, whilst a reduction in the draught lessened the number of horses required. The addition of the "damp weather gear" followed. This enables stripping to be done in cold weather when the straw is not so brittle as it is on a hot day. South Australian makers export a large number of strippers every year to neighboring States and Argentina.

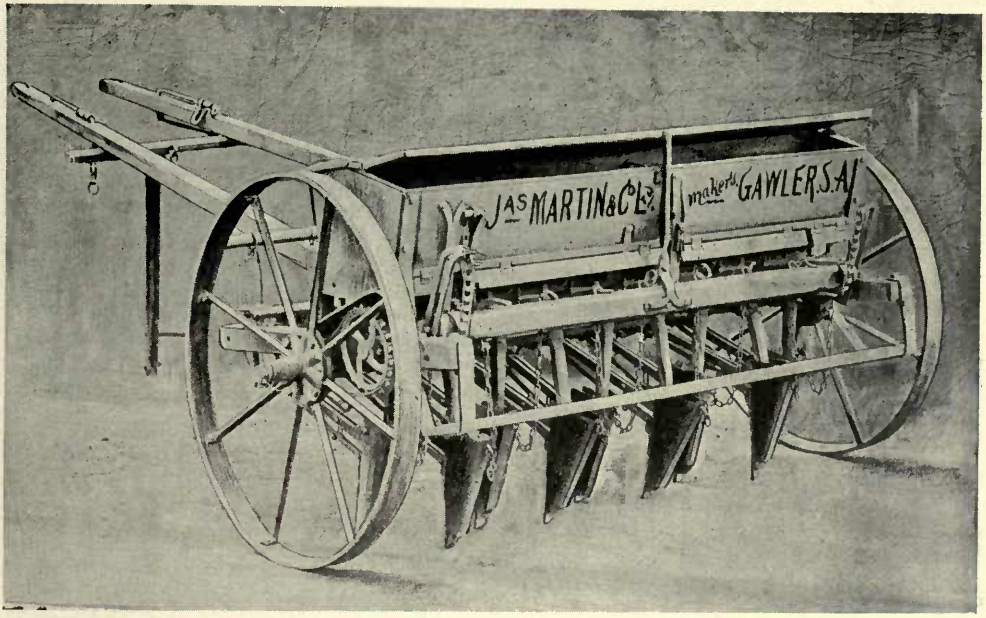


A Modern Stripper—Jas. Martin & Co., Ltd., Gawler.

From the perfected stripper, or reaping machine, to the "harvester"—a combination of stripper and winnower—appears a simple evolution. The adaptation cost the machinist a great deal in time and money. The advantages of being able to strip, clean, and bag a crop in one operation have long been recognised, but accompanying disadvantages and difficulties prevented such a machine coming into extensive use until recently. South Australia took the lead in endeavoring to produce such a machine, for late in the seventies the Government offered a bonus of £4,000 to the successful inventor of a machine that would reap, thresh, clean, and bag in one operation. As the outcome of this offer three trials were held in December, 1879, at the farm of Mr. John Riggs, near Gawler. On the 17th there were 14 machines entered, and on the 23rd 10 competed. The result of these tests was that the



A Stump-jumping Plough—Jas. Martin & Co., Ltd., Gawler.



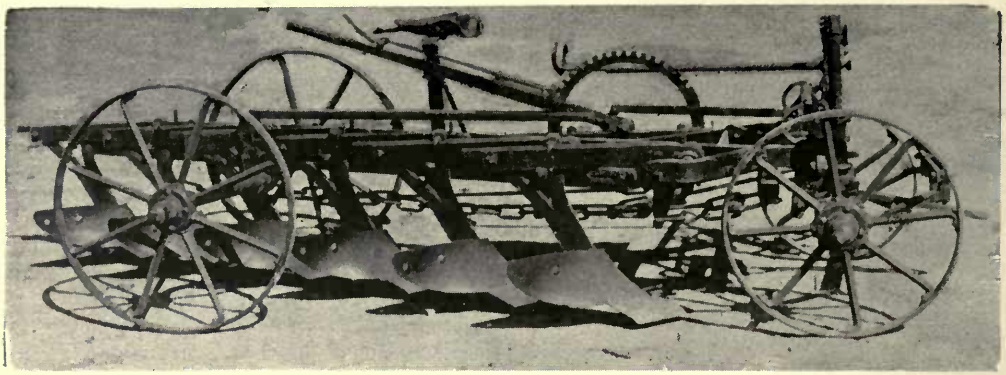
A Modern Seed-drill—Jas. Martin & Co., Ltd., Gawler.

judges—Messrs. E. W. Pitt, Robert Smith, James Clark, William Ferguson, and John Riggs—selected four machines to be tried again on the 24th. The judges, in their report to the Commissioner of Crown Lands, were of the opinion that no machine as exhibited to them did its work in such a manner as to entitle the owner to the £4,000 offered. Of the machines exhibited those which possessed the most merit stood in this order:—George Marshall, of Alma; J. H. Adamson, of Auburn; George Phillipson, jun., of Wangaratta, Victoria; James Martin and Co., of Gawler. To these exhibitors the judges recommended that the following awards should be made:—Marshall, £100; Adamson, £70; Philipson, £50; Martin and Co., £30. The adjudicators also recommended that, considering the amount of money spent by some of the competitors and the importance of labor-saving machinery, trials should be arranged for the following harvest. Among the machines which the liberal bonus attracted was a monster implement from America, which required 14 horses to draw it.

South Australian machinists were not to be denied, however, more particularly when Victorian competitors came into the field. After repeated attempts and as many failures "complete harvesters," fulfilling all requirements, have been made available, and a large number of them are in use in South Australia, Victoria, and New South Wales.

An important auxiliary to the stripper is the winnower. This machine has occupied an important place among the implements on the farm. The climate of South Australia is particularly favorable to the gathering of grain crops. The weather at harvest time is dry. There is little or no humidity. When the wheat is reaped by the stripper—that is, the heads taken off and threshed—the grain mixed with chaff is placed in heaps. As soon as convenient the winnower is brought into requisition, and it separates the wheat from the chaff

Haymaking has also been simplified in the great fields of Australia. English methods were quite inadequate to cope with the work to be accomplished. First there was the scythe and hand rakes. Then came the old-fashioned mowing machine and horse rake. These have been completly superseded by the binder, which does all the work in the one operation. Not the least important "aid to agriculture" in South Australia is the stump-



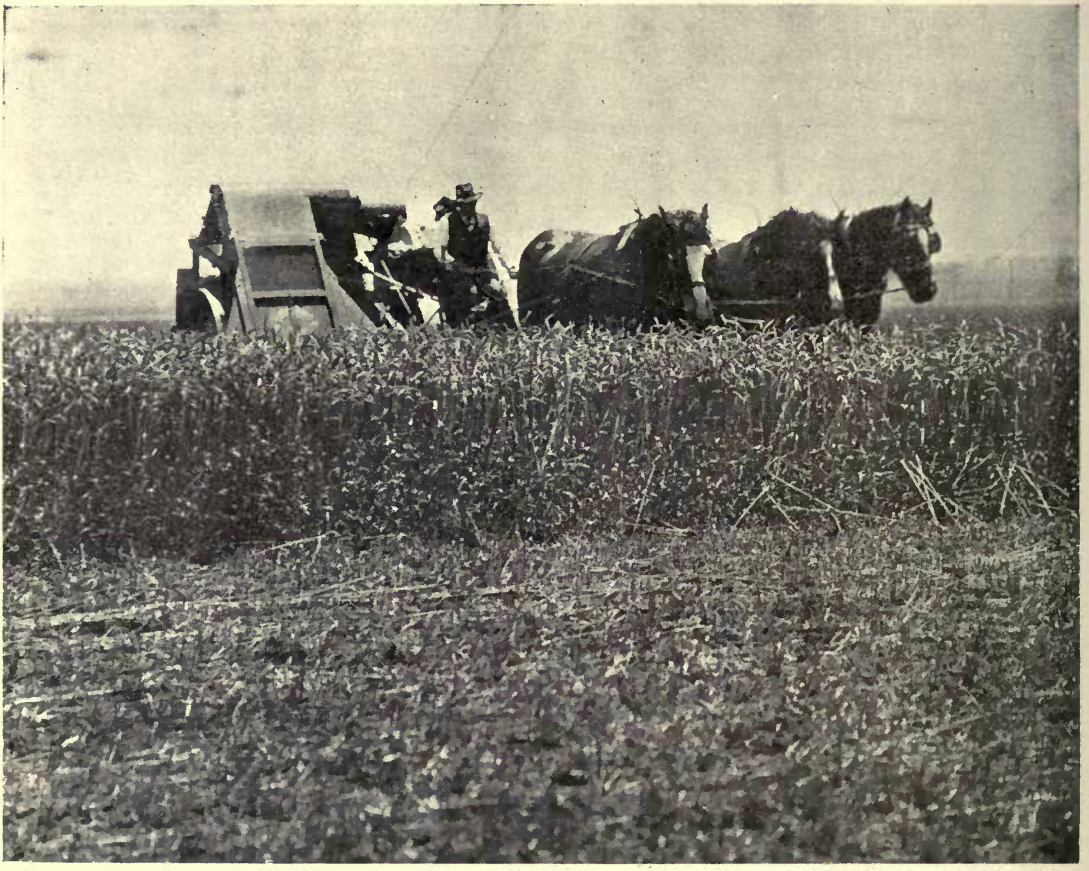
Patent Stump-jump Gang Plough, manufactured by Clarence H. Smith, Ardrossan, Yorke's Peninsula.

jumping plough. The early settlers used wooden implements similar to those which did service in ancient Egypt. Wooden ploughs and harrows were manufactured in South Australia, but they soon became relics, and as such they still command a small value. The two-furrow was quickly followed by the three, four, and five, but the most significant development took place when the mallee scrub lands were occupied. For a time settlers cut down the trees and dug out the roots, but this process proved costly and tedious. Scrub farming in the mallee lands of Australia would astonish an English farmer. Mallee scrub consists of light timber varying in size from whipsticks up to timber a few inches in diameter. At first the practice was to cut down the trees and grub up the roots, but soon South Australia led the way in a new system which revolutionised agriculture in the mallee lands of the Continent. A man named Mullins cut down the trees on his scrub sections level with the ground, and, taking a V-shaped log, he drove long spikes through it. He hitched the horses on to the pointed end of the V-log and dragged the home-made implement over the stump covered field. The wheat thus scratched in did well, and the crop yielded a good return. There was no difficulty in working a reaping machine over the stumps and stripping the grain. This system of farming in the scrub country was termed "Mullinising." Its simplicity, cheapness, and effectiveness soon caused it to become popular. The next evolution was the rolling down of the light mallee by means of heavy rollers—old boilers from a mill furnace proved the most serviceable, and they were eagerly sought after. The owner of a good roller had no difficulty in obtaining contracts for the levelling of the mallee. The roller was pushed in front of bullocks or horses, and the scrub was flattened down. When the timber was dry enough a fire was started, and in the early days of this system this practice led to a number of disastrous bush fires. The V-shaped log soon gave place to improved implements of the stump-jumping class, and so perfect have these become that fields full of mallee roots below the surface can be cultivated as successfully as meadow lands. The problem which presented itself when the timber had been cleared off was how to cultivate the land with the roots still in the ground. The brothers Smith, on Yorke's Peninsula—Messrs. R. B. and C. H.—solved the difficulty by inventing and perfecting a stump-jumping plough.

There is more than one claimant for the honor of having introduced this exceedingly useful invention. It is contended, on behalf of Mr. R. B. Smith, that his plough, The Vixen, made in June, 1876, was the pioneer. He registered his invention on February 19, 1877. This secured him for 12 months, but on account

of the difficulties and expenses attending the taking out of patents under the old Act, he did not apply for one. Mr. J. W. Stott, formerly of Alma, claims to have made the first practicable stump-jump plough, and supplied a large number of these implements to farmers. Mr. Shapland is another who has urged his rights to be considered the inventor of the principle. Messrs. Martin & Co., of Gawler, assert that they were the first to put the idea into practical form, and that they did so at the instance of Mr. Mullen, of Wasleys, the father of the process of scrub-clearing known as "Mullenising." No matter to whom the idea originally occurred, or whether it was thought of by two or more at the same time, the stump-jump plough has, next to that of the stripper, been the most valuable invention in connection with our agricultural industry. It is a coincidence that neither of these were patented, and that the public received the benefit of them without any reduction for royalties. Mr. R. B. Smith worked very hard at his idea, and it was unfortunate for him that his implement did not immediately achieve the success it subsequently obtained, as he would have then been encouraged to take advantage of the full protection of the Patent Act. In a letter he wrote later he remarked, somewhat pathetically: "My invention has cost me some money, some anxiety, and condemned my little ones to all the miseries of poverty and banishment in the bush, whereas if I had been a successful cricketer, a good bowler, or a rifle shooter without pluck, a Blondin or an acrobat, I and mine would have escaped these ills." However, in 1882, Parliament provided some solatium for Mr. Smith in granting him a vote of £500. Perhaps no one has done more than did the late M. C. H. Smith, of Ardrossan, to improve the stump-jumper and make it the popular implement it is to-day. His new six-furrow stump-jumping plough is a marvel of ingenuity and good workmanship. Messrs. R. B. and C. H. Smith were working together in 1876, and it was from the interchange of ideas between the two brothers that the first stump-jumper is said to have originated. Certain it is that Mr. C. H. Smith is entitled to much credit for the present position which this implement occupies. His factory is now under the control of his sons.

Professor Lowrie observed in one of his annual reports:—"Our leading farmers are satisfied that they get a better seed bed by the use of the multiple plough in place of the scarifier. On lands where the dandelion or Cape weed is plentiful, it will be found far superior to the scarifier as a means of cleaning the fallows in autumn, and, indeed, wherever there is a growth of vegetation fairly established, and especially in damp weather, the scarifier is not in it with the multiple plough." The improvements which South Australian manufacturers have effected in the plough, and its kindred cultivators, the scarifier and harrows, must have cheapened the cost of of cultivation very considerably. The introduction of the seedsower, which has displaced the old laborious process of hand seeding, has also saved valuable time and secured greater efficiency.



The "Sunshine" Harvester at Work.

The above illustration shows the celebrated "Sunshine" Harvester at work in the field. This machine, which begins and finishes the work of harvesting—taking the grain from the standing crop and delivering it in the sacks ready for market—was invented some years ago by a young Australian farmer, Mr. H. V. McKay. He is the present manufacturer, and his operations extend not only throughout the Australian Commonwealth, but over the grain districts of South America and South Africa also. The "Sunshine" is adapted for any kind of cereal crop, and, as it completes the harvest work in one operation, the economy effected by its adoption is enormous. Several thousands of these machines are in use, and the business is extending by leaps and bounds. The principal factory is at Ballarat, Victoria, but there are branch establishments in each of the States.

The Cultivation of Cereals.

Now that South Australia is a large exporter of cereals, it is instructive to note that on September 7, 1839, an Act was passed "in Council" and signed by Governor Gawler, "To impose certain Rates and Duties upon Wheat and other Grain, Flour Meal, and Biscuit exported from the Province of South Australia, and to prevent the clandestine exportation of the same." The preamble set out: "Whereas the present scarcity of wheat and flour in this province renders it most urgent for the public welfare that the improvident exportation of these articles should be checked in consequence of the constant increase of population therein, and its almost total dependence upon external supply, &c." Power was given to the Governor to "fix such rates and duties" as "shall seem fit and expedient on all cereals exported." Persons intending to ship such produce had to give four days' notice, and any omission to do this rendered them liable to forfeit the goods and "pay treble the value of the article so attempted to be shipped." The provisions of this Statute were carefully worked in order to guard against "clandestine exportation" of cereals! Within twelve years of this peculiar decree grain grown in South Australia took first prize in London against the world! This was at the great Exhibition of 1851 promoted by the Prince Consort. A few years later and this State had firmly established its claim to be regarded as the granary of Australia. From that time onward South Australian wheat has enjoyed a world-wide reputation for quality. The favorable character of soil and climate enable the farmer to develop the wheat plant to a high standard. For milling purposes there is no grain in the world to excel that produced in this State. It commands top market price in Mark Lane, and is in demand throughout the Commonwealth for seed purposes. During the present year the Governments of New South Wales and of Queensland purchased large quantities for seed on behalf of farmers in those States. There are few countries where the cost of growing cereals is lower than it is in South Australia. Mr. Coghlan, the Statistician of New South Wales, writing in 1896, said:—"Owing to favorable conditions of culture, a yield of 7 bushels in South Australia is financially as satisfactory as one of 15 bushels in New South Wales, or of 20 bushels in New Zealand." This was the experience almost from the first, but in later years economies on the farm have been made possible as the result of the introduction of labor-saving machinery. A prominent farmer was paid in the early days £1 an acre for harvesting with a sickle, and 1/ a bushel for threshing with a flail, equal to £2 an acre for a 20-bushel crop. Taking the figures made public by the late Captain Bagot as a basis, the cost, minus rent, taxes, and seed, in 1842 works out thus:—

Ploughing and sowing, per bushel	£0	0	5
Harvesting	0	2	0
	£0	2	5

In 1843, with the Ridley reaper, the cost figured out as follows:—

Ploughing and sowing	£0	0	5
Harvesting	0	0	3½
	£0	0	8½

A few years ago a leading farmer on Yorkes Peninsula published some interesting statistics concerning the cultivation of 1,000 acres of land by himself. The particulars were in detail, and bore the impress of actual experience. The mechanical operations of his farm cost him as follows:—

Ploughing, per acre	£0	2	3½
Sowing	0	0	2
Harrowing	0	0	7½
Reaping	0	1	5½
Winnowing	0	0	5
Cost per acre	£0	4	11½

This was generally regarded as being below the cost of the average farm in South Australia. The following estimate was given by a well-known farming authority in the Lower North, where holdings are smaller.

Cultivation, including ploughing, scarifying, harrowing, providing for fallow	£0	8	3
Sowing	0	0	10
Reaping (say 12 bushels) ...	0	3	4
Winnowing	0	1	3
Total per acre	£0	13	8

Or 1/1⅔ per bushel. This may be taken as a fair estimate of the purely mechanical operations of the farm in those districts where temporary soil exhaustion was a few years ago plainly indicated. For the State as a whole it may be doubted whether the average cost per acre would reach 8/. This compares favorably with any other Australian State, Argentina, and most districts in the United States or Canada, and justifies Mr. Coghlan's comments already quoted.

Land under tillage in Australia aggregates 11,031,926 acres, showing an average of 2.9 acres per head of the population, compared with 3 acres in the year preceding. In proportion to population South Australia, in 1902, had the largest area under cultivation—3,122,800 acres, forming nearly one-third of the whole acreage tilled in the six States, whilst the rate per head is three times the average of the whole, being 8.6 acres, as against 9 acres in the previous season. Victoria comes next with an average of 3 acres per head, against 3.3 in the preceding season, the total area being 3,810,413 acres. New South Wales follows with an average of 2 acres, compared with 2.4 per head the year before, the total area being 2,746,209 acres; Western Australia, 216,824 acres, or 1.1 acre per head; and Queensland, 541,996 acres, or one acre for each unit of the population. The population, exclusive of Northern Territory and aborigines, in 1891 was 310,426, and at the census of 1901 had increased to 354,001, an addition of 43,575 persons, or 14 per cent. During the same period the area under cultivation had increased from 2,649,098 acres to 3,279,406 acres, an addition of 630,308 acres, or 24 per cent., as compared with an increase of 3 per cent. during the preceding decade, 1882-91. There were 9 acres of tilled ground per head of the population, as compared with 8.4 at the date of the census of 1891.

It was Mark Twain who declared that "farming is healthy work, but no man can run a farm and wear his best clothes at the same time." The underlying truth in that remark has been well observed by the average South Australian rural producer. He is a hard worker. The agricultural industry would not be in the prosperous condition it is were it not for the energy, skill, and enterprise of the farmer. If labor-saving machinery has helped the grain grower to minimise the cost of production and lighten his labors, science has also come to his aid. By-products of the farm have greatly assisted in making agricultural pursuits more profitable as well as more interesting. The struggle is not such an uphill one as it was, so that a man of ordinary intelligence and a little capital can do well and live a healthy life in the farming districts of this country.

The production of cereals early received the attention of the pioneer. In 1838 twenty acres were under wheat. The following year about 120 acres yielded at the rate of 25 bushels per acre. Wheat was worth 15/ per bushel in the local market. All doubts concerning the fertility of the soil were soon removed, but as the area of cultivation extended, fresh difficulties arose. Mr. Francis Dutton, writing in 1846, said: "The farmers all knew that the land would grow corn in abundance; but they put in their grain with fear and trembling, not knowing but that when the crops were ripe the half of them might be shed before they could get sufficient hands to reap them." The invention of the stripping machine already referred to helped to solve the labor problem, and from that time the "area under cultivation" rapidly expanded. As new hundreds were surveyed and thrown open for selection farmers moved further away from the centres of settlement, and within twenty years of the proclamation of the province breadstuffs to the value of £556,000 were shipped abroad. In 1864 exports totalled £1,464,000. The area under wheat had by that time increased to 390,000 acres.

During the next ten years the area under cultivation was more than doubled, and over six million bushels of wheat were reaped. By 1884 the acreage under grain had risen to 1,942,453, and the production was 14,621,755 bushels, or an average yield for the whole State of 7.53 bushels. Shipments of grain in 1883 reached a value of £2,491,896. The following table shows acreage sown for wheat, the total yield, and the average per acre in the seasons named:—

Year.	Acreage.	Produce Bushels.	Average. Bushels.
1884-5 ...	1,942,453	14,621,755	7.53
1889-90 ...	1,842,961	14,577,358	7.91
1890-1 ...	1,673,573	9,399,389	5.62
1891-2 ...	1,552,423	6,436,488	4.15
1892-3 ...	1,520,580	9,240,108	6.08
1896-7 ...	1,693,045	2,804,493	1.66
1897-8 ...	1,522,668	4,014,852	2.64
1898-9 ...	1,788,770	8,778,900	4 91
1899-1900 ...	1,821,137	8,453,135	4.64
1900-1 ...	1,913,247	11,253,148	5.88
1901-2 ...	1,743,452	8,012,762	4.60
1902-3 ...	1,746,842	6,354,912	3.64

The foregoing are official figures gathered by the Statistical Department of the Government. Every care is exerised by the officers in their compilation, but there is an impression abroad that the tendency of the official information collected direct from the farmers, is to understate actual production. In this connection it is interesting to compare the following returns compiled each year by "The Register." In the official figures the average yield based on the acreage "sown" is stated. The acreage "reaped" is taken as the basis of "The Register's calculations, and is the system adopted in most countries.

"THE REGISTER'S" HARVEST ESTIMATE.

Season.	Acres Reaped	Total Yield. Bushels.	Average.
1890-1	1,673,573	9,399,389	5.37
1891-2	1,544,600	7,373,770	4.46
1892-3	1,710,355	11,435,272	6.41
1893-4	1,725,423	14,042,125	8.8
1894-5	1,552,900	7,557,446	4.52
1895-6	1,521,910	6,658,600	4.22
1896-7	971,930	2,690,100	2.46
1897-8	988,250	3,705,937	3.45
1898-9	1,550,000	9,816,666	6.20
1899-1900 ...	1,700,000	10,200,000	6.0
1900-1	1,600,000	13,200,000	8.15
1901-2	1,500,000	8,750,000	5.50
1902-3	1,300,000	7,800,000	6.0

The summary of wheat production during the past 42 years illustrates the growing importance of this industry, notwithstanding the checks given at times owing to unfavorable seasons.

Season.	Acres	Bushels.	Average Yield.	Mean Annual Rainfall (Adelaide).	SHIPMENTS BREADSTUFFS. Tons.	Value.	Average price per bushel (Pt. Adelaide).
1861-1865	353 600	19,785,248	11·20	21·03	329,762	£4,748,831	6 7
1866-1870	535 605	24,328,799	9·08	19·15	342,748	4,220 176	5 4
1871-1875	795,112	31,484,334	9·93	22·63	711,280	7,471.992	5 2
1876-1880	1,348 973	47,091 784	6·98	20·67	811.633	8,311,589	5 4
1881-1885	1,837.226	49 875,134	5·43	18·95	941.018	7,921,981	4 7
1886-1890	1,808,307	60,010,747	6·64	22·26	1.032,777	8,192 353	4 0
1891-1895	1,558,724	43,005 181	5·52	19 81	728,402	4,618,716	3 4
1896-1900	1.747,773	35,304,528	4·04	18 37	589,397	3,470 630	3 6
	59 926 592						
Total 40 years (mean)	1 248 165	318 885,755	6·39	20·36	5,487 107	£48,956,268	4 9

During the forty years (1861-1900) the total number of acres of wheat sown was 49,926,592 acres, off which 318,885,755 bushels were reaped, giving an average yield for the acreage sown of 6.34 bushels per acre. The average rainfall was 20.36 inches. The quantity of breadstuffs shipped during the same period was 5,487,107 tons, of the total value of £48,956,268, and the average price of wheat at Port Adelaide 4/9 per bushel. The table affords an opportunity of comparing the results of the first twenty years (1861-1880) with those of the last 1881-

1900), and of tracing some of the causes of decline in wheat-production during the latter period. During the first half 15,166,441 acres were sown, producing 130,690,165 bushels, averaging 8.62 to the acre, the average rainfall being 20.87 inches; 2,195,423 tons of breadstuffs were exported, £24,752,588 value, the price of wheat averaging 5/7 per bushel. In the next half 34,760,151 acres were sown, yielding 188,195,590 bushels, or 5 41 bushels per acre, the average rainfall was 19.85 inches, and 3,291,684 tons of breadstuffs, value £24,203,680, were shipped, the price of wheat averaging 3/10 per bushel.

Practically the whole of the cereal crop is grown in the Central (545,982 acres), Lower North (535,308 acres), and Upper North (482,494 acres) divisions, the average ordinary rainfall being 21, 17, and 14 inches respectively. The fall in 1902 was 15 (18), 12 (13), and 9 (9) inches. In the Western Division (171,719 acres) the rainfall was 15 (15), and in the South-East (28,320 acres) 19 (20) inches. The Upper North, which has only been under agricultural settlement for twenty-four years, embraces country north of Petersburg, and is beyond what is popularly known as Goyder's line of rainfall, at one time the supposed limit of cereal production. Mr. L. H. Sholl, the Government Statist, in his last official report, from which the official data are taken, further points out that "55,000,000 bushels were reaped in the Upper North during the 20 years, 1876-1895," or "more than one-fourth of the entire production."

The following table showing the area under wheat, bushels reaped, and yields per acre in the Upper North from 1881-1902, does not support the view sometimes expressed that these remote districts are "not fit for wheat growing." The general average is likely to be increased by improved methods of cultivation:—

Season	Acreage under Wheat	Wheat in Bushels.	Yield per acre. Bushels.
1881-2	506,843	1,733,927	3.00
1882-3	640,529	1,744,782	2.72
1883-4	590,087	3,992,902	6.76
1884-5	600,750	4,880,980	8.12
1889-90	448,100	5,001,564	11.20
1890-1	475,250	3,019,476	6.35
1891-2	463,877	2,594,797	5.60
1892-3	463,191	3,110,219	6.71
1896-7	537,261	310,874	0.58
1897-8	510,754	653,216	1.28
1898-9	531,712	1,380,624	2.60
1899-1900 ...	535,912	2,056,360	3.84
1900-1	552,932	1,898,176	3.43
1901-2	462,123	1,465 728	3.17
1902-3	482,494	345,360	0.71

The extent of land under cultivation, and the description of crop are shown in the following, and they afford material for interesting comparisons:—

Crop.	Acres under Cultivation.									
	1890-1.	1891-2.	1892-3.	1896-7.	1897-8.	1898-9.	'99-1900.	1900-1.	1901-2.	1902-3.
For Grain—										
Wheat	1,673,573	1,552,423	1,520,580	1,693,045*	1,522,668	1,788,770	1,821,137	1,913,247‡	1,743,452§	1,746,842
Barley ..	14,472	11,461	13,285	14,484	13,232	16,962	15,767	15,352	15,517	21,493
Oats	12.475	12,637	15,745	40,215	31,398	25,823	20,229	27,988	34,660	50,296
Peas	4,358	4.290	4,705	3,519	2,917	3,491	3,842	4,454	4,938	5,452
For Green Forage—										
Wheat, Oats, &c.	2,634	845	1,333	1,322	1,266	1,252	1,104	3,009	2,172	2,096
Lucerne	4,715	5,571	6,456	6,049	7,452	8,899	11,356	10,127	11,523	12,841
Sown Grasses ..	21,431	17,519	20,210	20,027	20,083	20,946	21,593	22,186	23,510	23,636
Other Crops	4,615	2,663	4,230	3,936	2,617	2,002	1,520	2,556	2,066	3,464
Hay	345,150	304,171	434,116	339,257	449,167	316,413	311,440	341,330	369,796	325,789
Potatoes	6,626	6,892	6,014	6,417	6,449	6,653	8,406	6,628	6,248	7,763
Orchard	8,736	8,928	9,918	11,746	13,054	14,396	15,477	16,001	16,315	17,376
Garden	6,626	5,494	5,853	6,669	7,574	7,994	8,524	8,830	9,005	9,489
Vineyard	9,535	12,314	15,418	18,333	18,761	19,159	19,438	20,158	20,860	21,692
Fallow Land	534,152	588,083	567,878	512,561	507,484	734,610	822,013	887,540	862,738	888,946
Total	2,649,098	2,533,291	2,625,741	2,584,395†	2,604,122	2,967,370	3,081,846	3,279,406	3,122,800	3,137,175

* 605,723 acres of wheat were not reaped. † Owing to drought 93,185 acres of wheat sown for grain were cut for hay, which were not included in the total. ‡ Owing to drought 339,230 acres were not reaped. § 169,795 acres less wheat sown, 28,466 acres more hay cut, and 299,348 acres not reaped owing to drought.

In the following table is shown the gross produce and average yield of the various crops:—

Year.	Wheat (bushels).		Barley (bushels).		Oats (bushels).		Peas (bushels).		Hay (tons).		Potatoes (tons).		Wattle Bark (tons).
	Produce.	Avg.	Pr'duce	Avg.	Pr'duce	Avg.	Pr'duce	Avg.	Pr'duce	Avg.	Pr'duce	Avg.	
1889-90 -	14,577,358	7.91	246,841	12'54	131,449	12'77	57,800	13'55	395,920	1'20	23,853	3'74	—
1900-1 -	9,399,389	5'62	175,583	12'13	116,229	9'32	64,068	14'70	310,125	'90	23,963	3'62	4,372
1891-2 -	6,436,488	4'15	107,183	9'35	80,876	6'40	68,655	16'00	193,317	'64	27,824	4'04	3,904
1892-3 -	9,240,108	6'08	175,468	13'21	166,489	10'57	69,922	14'86	389,277	'90	20,057	3'34	3,131
1896-7 -	2,804,493	*1'66	107,798	7'44	189,716	4'72	30,350	8'62	170,808	'50	16.139	2'52	5,030
1897-8 -	4,014,852	2'64	162,065	12'25	204.444	6'51	31,936	10'95	298,184	'66	9,308	1'44	6,830
1898-9 -	8,778,900	4'91	234,135	13'80	304 002	11'77	51,151	14'65	258,518	'82	14,445	2'17	8,217
1899-1900	8,453,135	4'64	188,917	11'98	318,331	10'79	52,883	13'76	229,800	'74	19,716	2'35	8,038
1900-1 -	11,253,148	5'88	211,102	13'75	366,229	13'09	67,415	15'14	353,662	1'03	14,566	2'20	8,330
1901-2 -	8,012,762	4'60	243,362	15'68	469,254	13'54	97,577	19'76	346,467	'94	15,059	2'41	8,566
1902-3 -	6,354,912	3'63	317,155	14'70	620,823	10'35	89,654	16'62	308,825	'95	28,312	3'63	9,212

*Owing to drought 605,723 acres were not reaped.

In his annual report for the season 1902-3, the Secretary for Agriculture, Professor A. J. Perkins, points out that with a total rainfall in 1902 considerably below the previously-recorded mean, and a distribution that in nowise tended to compensate this difficulty, it might perhaps have been anticipated that by comparison with average returns such conditions would have been gloomily reflected in the harvest field. A glance at the table below, in which are summarised the returns from our main crops in the different districts, will show that this is very far from having been the case.

AGRICULTURAL RETURNS IN 1902-3, CONTRASTED WITH MEANS OF PRECEDING SIX YEARS.

	CENTRAL DISTRICT.		LOWER NORTH.		WEST COAST.		SOUTH-EAST.		UPPER NORTH.	
	1902-3.	Mean of Previous Six Yrs.	1902-3.	Mean of Previous Six Yrs.	1902-3.	Mean of Previous Six Yrs.	1902-3.	Mean of Previous Six Yrs.	1902-3.	Mean of Previous Six Yrs.
Wheat (bushel)	2,921,152	2,636,333	2,351,692	2,443,687	448,618	540,381	288,090	304,979	345,360	1,294,163
Oats "	280,437	154,457	47,649	33.075	27,495	9,981	264,690	94,249	552	235
Barley "	189,458	113.894	16,558	14,605	22,011	12,813	89,128	47,598	nil	2,320
Hay (tons) -	197,100	163,871	87,610	70,480	6,584	5,008	18,563	14.774	15,932	22,107
Potatoes " -	6,846	5,627	nil	17	nil	11	21,466	9,211	nil	6

This table is self-explanatory, and needs but little comment. It will be noted that in the Central District returns in wheat, oats, barley, hay, and potatoes were all in excess of means of the preceding six months; in the Lower North, whilst wheat is in slight deficiency, oats, barley, and hay are in excess; on the West Coast results coincide with those in the Lower North; similar returns come from the South-East, where the potato crop attained remarkable proportions; the Upper North alone is characterised by heavy deficiencies. Nor does it appear that these satisfactory bulk returns are merely a consequence of an expansion of the area under cultivation, which would perhaps tend to mask a contraction in yields. An examination of the following table, in which are contrasted the yields per acre of wheat and hay during the past season with the means of the previous six seasons, shows that this is not the case:—

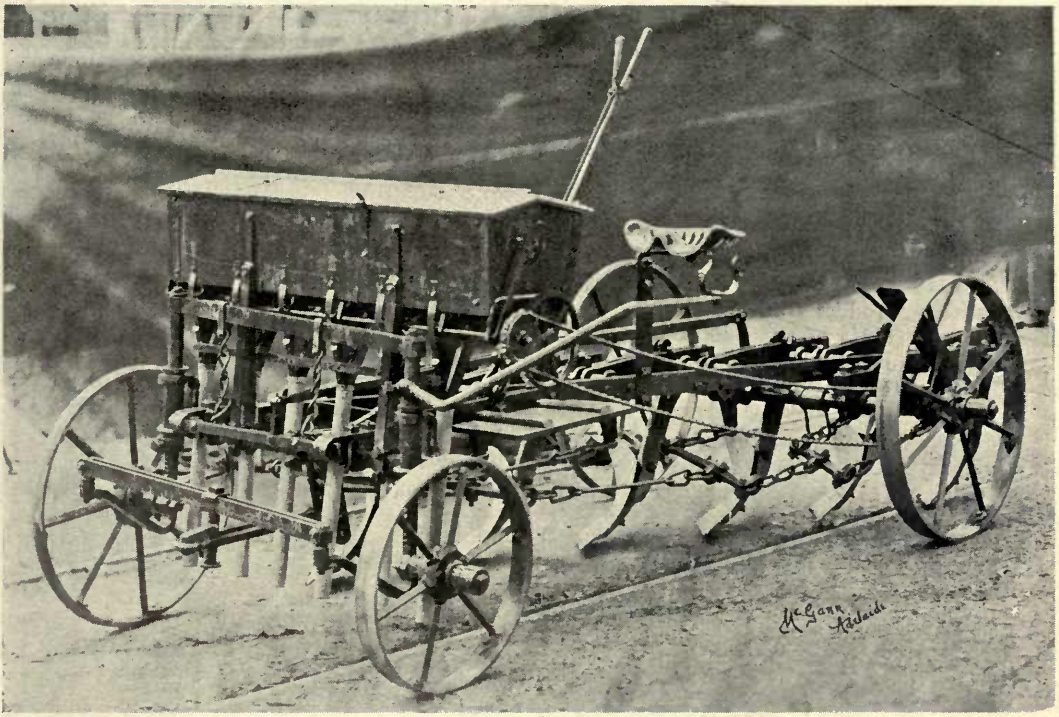
SHOWING YIELDS PER ACRE OF WHEAT AND HAY IN 1902-3 CONTRASTED WITH MEANS OF PRECEDING SIX SEASONS.

	WHEAT.		HAY.	
	1902-3.	Mean of Previous Six Seasons.	1902-3.	Mean of Previous Six Seasons.
	Bushels.	Bushels.	Tons.	Tons.
Central District ...	5·59	4·91	1·04	0 86
Lower North	4 36	4 62	0 74	0·68
Western District ...	2·70	3·63	0·58	0 60
South-East	8 25	8 07	1·34	1 09
Upper North	0 71	2·48	0 60	0 58

Except in the Central District, the yields of wheat per acre are generally slightly below the means of the preceding six years, whilst the yields in hay are slightly above the means. The complete failure of the Upper North excludes it from these comments.

"We find ourselves faced, therefore," says Professor Perkins, "with a season over which the rainfall was not only considerably below normal means, but extremely badly distributed, and during which harvest returns were nevertheless generally in excess of those of preceding seasons. It seems to me that improved and more rational soil tillage that has latterly come into use, coupled with the general spread of phosphatic manures, are mainly responsible for this satisfactory state of things. The complete failure of the Victorian crops north of the Dividing Range, over which reigned weather conditions no worse than those that characterised our Lower North, is, if it were needed, an additional argument in support of this view. Such, then, having been our returns in a most unfavorable season, so far as rainfall is concerned, it remains yet to be seen how much in excess of our anticipations will be under the influence of improved methods the returns in the favorable seasons that we have good reason to hope lie hidden in the immediate future."

On the question of how the rainfall affects the grain harvests, Sir Charles Todd (the Government Astronomer) observes:—"We have to look, not so much at the quantity of rain which falls in any year—which may be swelled by summer storms—nor even at the mean annual rainfall, but at the general distribution of the rain, or the months in which rain may be looked for in sufficient quantities to adequately reward the labor expended in cultivating the soil." He further remarks:—"We cannot, as a rule, expect a good harvest without copious rains in the period May to October. The total rainfall for the year may, however, be comparatively small, and yet the harvest good (as in 1864, when it only averaged 18.83 inches, taking the whole of the agricultural districts), provided the rainall is ample in the six months just specified. On the other hand, the total rainfall may be large, but the yield small, if the winter rainfall is deficient, or if heavy rains and adverse atmospheric conditions occur late in October, November, and December, as was the case in 1871, when the rainfall averaged 23.25 inches, and the yield was only 5 bushels 45 lb."



Patent Seed and Fertiliser Plough Combination, manufactured by Clarence H. Smith, Ardrossan, Yorke's Peninsula.

Hay.

Hay-growing is a popular and profitable auxiliary to the production of grain. Fields sown for wheat are for various reasons—mostly because hay promises to pay better—cut for hay. During the last few years chaff mills have sprung up all over the State, while several compressed fodder works have been erected. Large exports of chaffed hay have taken place to other States, and South Africa is a large customer for compressed fodder. The quantity of hay cut last season was estimated at 308,000 tons, and prices ranged up to as much as £7 per ton. In many cases farmers were known to have realised as much as £3,000 to £5,000 for their hay alone; and one leading authority declares that fortunes have been made out of hay-growing in South Australia during the last few years. According to the official returns the total quantity of hay reaped was 308,825 tons, taken from 325,789 acres. This return was slightly less than the previous year, when 369,796 acres yielded 346,467 tons. In 1900-1 the production was 353,622 tons, but, while this year farmers have been tempted by the price to cut far more hay in the previous summers, they were forced to do so by the prevalence of red rust. The average yield this season was 0.95 ton to the acre, while at the previous harvest it was 0.94. The central district, which is the largest producer of hay, contributed 205,546 tons from 197,100 acres, and the Lower North 65,114 tons from 87,610 acres. The South-East is the third producer, having supplied 24,877 tons from 18,563 acres; while the Upper North reaped 9,485 tons from 15,932 acres; and the Western district 3,803 tons from 6,584 acres. The hundreds producing the biggest returns

were:—Adelaide, 62,341 tons from 51,561 acres; and Light, 50,137 tons from 45,893 acres. Grey, in the South-East, had by far the best average, having 16,208 tons from 9,016 acres, or 1.180 tons to the acre. The vast proportion of the produce came from between Adelaide and Manoora. Shipments have increased from 9,185 tons, valued at £22,402 in 1900, to 23,981 tons, worth £75,000 in 1901, and 98,000 tons, estimated at £425,000. There are several compressed fodder mills in the State, and large shipments of the compressed article —a mixture of chaff and bran are now sent away to the other States and to South Africa. The mean price of hay in the Adelaide market for the six seasons (1896-1902) was £2/5/2 per ton. In 1902-3 it stood at £3/15/6. Last year's crop on this basis had a monetary value of £1,165,814.

The following is the official returns of the hay yields for the seasons stated:—

	Produce Tons	Average. Tons
1890-1	310,125	.90
1891-2	193,317	.64
1892-3	389,277	.90
1896-7	170,808	.50
1897-8	298,184	.66
1898-9	258,518	.82
1899-1900	229,800	.74
1900-1	353,662	1.03
1901-2	346,467	.94
1902-3	308,825	.95

There is a Customs duty of 20/ per ton on hay.

Oats.

The cultivation of oats receives considerable attention on Yorkes Peninsula, where last season 13,800 acres were sown, from which 108,000 bushels were gathered. The largest producer is the South-Eastern district, of which Mount Gambier is the centre. The acreage there was 8,472, but so prolific was the harvest that no less than 226,000 bushels were reaped. There are two oatmeal factories at Mount Gambier, where the bulk of the oatmeal consumed in the State is manufactured. Oats grow luxuriantly in the South-East, where there is great scope for the expansion of what appears to be a profitable industry.

The total area under oats last harvest was 50,296 acres, which produced 620,823 bushels, as against 469,254 bushels the previous year. The following is the official statistics of the production of oats for the seasons stated:—

	Produce. Bushels.	Average. Bushels
1890-1	116,229	9.32
1891-2	80,876	6.40
1892-3	166,489	10.57
1896-7	189,716	4.72
1897-8	204,444	6.51
1898-9	304,002	11.77
1899-1900	218,331	10.79
1900-1	366,229	13.09
1901-2	469,254	13.54
1902-3	620,823	12.34

The mean price of oats in the Adelaide market for the six seasons (1896-1902) was 2/7 per bushel. In 1902-3 the price was 3/4. There is a duty of 1/6 per cental.

Barley.

The acreage under barley last year was 21,493 acres, which yielded 317,155 bushels, as compared with 15,517 acres, producing 243,362 bushels in 1901-2. Barley is chiefly grown in the South-East, where the yield last year was 85,000 bushels from 3,400 acres, and the Lower North and Kangaroo Island. The new duty is 1/6 per cental. The duty on malt, increased in 1891 to 4/6 per bushel, has not much affected the imported article, of which 26,789 bushels (value £8,052) were introduced in 1901, against 34,378 bushels (value £10,092) tne year previous. The following show the production and average yield of barley:—

	Produce. Bushels.	Average. Bushels
1890-1	175,583	12.13
1891-2	107,183	9.35
1892-3	175,468	13.21
1896-7	107,798	7.44
1897-8	162,065	12.25
1898-9	234,135	13.80
1899-1900	188,917	11.98
1900-1	211,102	13.75
1901-2	243,362	15.68
1902-3	317,155	14.76

The duty has been reduced from 8/ to 6/ per cental.

Field Peas.

Field peas, mostly cultivated in the hilly country in the Counties Adelaide and Hindmarsh, where pig-rearing and bacon-curing are chiefly carried on, is a crop which, as a rule, gives a better return than wheat, and is well known for its recuperative action on exhausted soils. It appears to have stood the drought well, as the average of 1897-8 was 11 bushels, in 1898-9 it was 15 bushels, in 1899-1900, 13.76 bushels, in 1900-1901, 15.14 bushels, in 1901-2, 19.76 bushels, and last year, 16.62. The area under cultivation was 15,452, as against 4,938 in 1901-2, and 4,454 acres the previous year. The production and average yields of field peas is shown in the following:—

	Produce. Bushels.	Average. Bushels.
1890-1	64,068	14.70
1891-2	68,655	16.00
1892-3	69,922	14,86
1896-7	30,350	8.62
1897-8	31,936	10.95
1898-9	51,151	14.65
1899-1900	52,883	13.76
1900-1	67,415	15.14
1901-2	97,577	19.76
1902-3	89,654	16.44

This crop, grown in the midst of our largest dairying districts, seems to be a factor in the future expansion of the bacon industry. The imports of bacon and hams, on which there is an impost of 3d. per pound, totalled 166,039 lb., value 5,745, against 213,725 lb., value £6,219, the year before.

Carting Grain to the Seaboard—A scene on the wharf at Port Pirie.

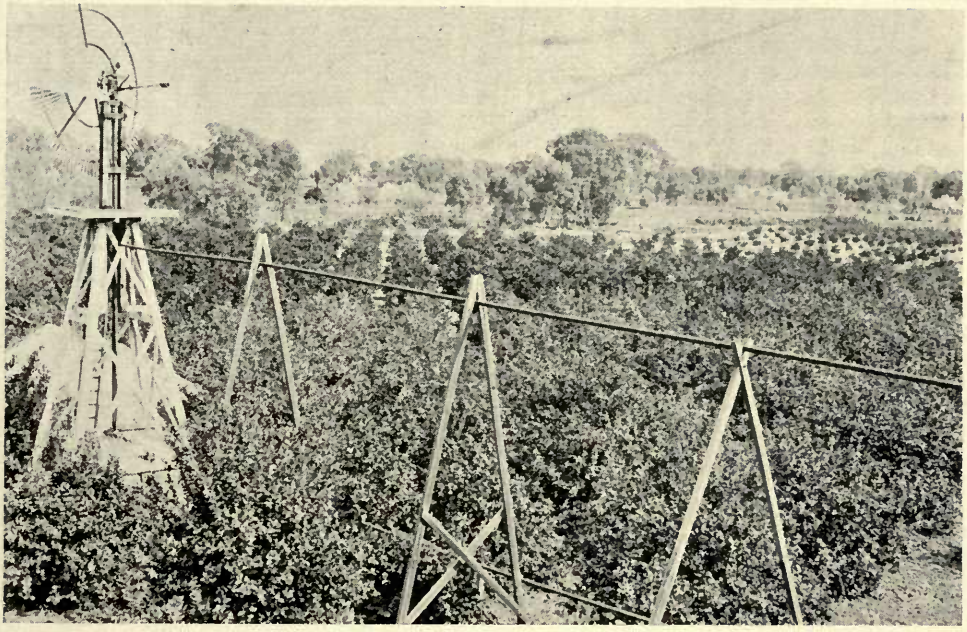
G. A. Ball photo.

Fruitgrowing.

Horticulture has long since passed out of the experimental stage. It is now firmly established upon a profitable commercial basis. There is a surplus production of many kinds of fruit, and the balance over and above requirements for home consumption is exported. Soil and climate are eminently suited to the production on a large scale of all kinds of fruit. The variation in conditions obtainable in different districts throughout the State enables fruitgrowers to diversify production and extend the season for each variety. Beginning with a few trees brought out by the pioneers from England and Cape Colony and plants introduced from New South Wales later on, the industry slowly expanded until the freezing chamber and improved transit facilities brought the great consuming centres of the old world nearer to producers. The possibilities of a profitable export trade were realised, the horticulturist awoke, and at once began extending his orchards and improving his methods of cultivation. A wonderful evolution has been witnessed during the last ten years. From "any sort of tree" the grower now makes a careful selection of the best kinds. Science has also entered the garden, and the successful horticulturist has become a close student of formulæ for spraying, also of the latest methods of pruning and manuring. There are colonists who remember the time when seedling peaches were produced in such abundance that the surplus supplies were fed to pigs. The export trade has changed all this and impressed growers with the importance of obtaining quality as well as quantity.

The fruit-growing areas of the State may be classified into three sections. The cool semi-humid localities represented by a large tract of country in the elevated districts of the Mount Lofty, Barossa, Stanley, and Wirrabara Ranges and the South-East. These districts are the home of the apple, pear, cherry, prune, and all of the berry fruits. The rainfall varies from 25 to 40 inches annually. The second zone includes the low hill country and the plains where the summer temperature is higher and the rainfall from 18 to 22 inches. Within this area the citrus tribe, stone fruits, and grapes, olive and almond grow to great perfection. Summer irrigation is practised by the largest orchardists. The water is either drawn from the State waterworks or from natural springs. The third zone includes the valley of the River Murray, which follows a serpentine course for 600 miles through South Australia to the Southern Ocean. Fruit-growing of a distinctive character on an increasingly large scale is being carried on by means of irrigation. The raisin and the currant vine, apricots, figs, oranges, and lemons find here a congenial climate. Sun-dried fruits of excellent flavor are being produced in increasingly large quantities, the clear, dry heat retaining the natural bloom and aroma of the fruit. Evaporation factories also exist in the fruit-growing districts, and this process of drying is largely favored. Preserving and jam-making establishments also account for a large annual home consumption, and South Australian preserved fruits and jams find a ready demand in Australia and abroad.

Fruit-growing in South Australia is destined to rank high among the primary industries. That the people are determined to make this an accomplished fact at an early date is evidenced by the manner in which they are entering the lists in the competition for the world's markets. Within the last decade the production of dried fruits, such as raisins and apricots, has exceeded the local demand. The growers of currant and sultana vines are making a bold bid to exclude the imported fruits by placing upon the markets of the Commonwealth a locally-grown article of superior excellence. Ten years ago the export of fresh fruit to London comprised a few scattered cases of apples sent in a spasmodic manner by one or two venturesome growers. Now the business has reached large dimensions.



Orange Grove, Salisbury.

G. Quinn photo.

The success obtained by shippers of apples has encouraged experiments to be made with fresh grapes, oranges, and pears with the most satisfactory results as will be shown. The Victorian commercial representatives in England sent the following report last season to the Minister for agriculture in Melbourne:—"One hundred and fifty cases of grapes from Adelaide, per Victoria, arrived in good order. These grapes were of the white Daria variety. They are pronounced by salesmen here to be identical with the Almeria grape, which is the best variety grown in Spain for the English market. It is a white grape. The flesh is firm, and it stands handling and transportation better perhaps than any other. At the conclusion of the Spanish fruit season, in October, speculators frequently buy quantities of Almeria grapes, which are packed in small barrels in cork dust. These are stored in London for periods varying from two to six months, and sold as opportunity offers. Some of these grapes stored in this way came under my notice a fortnight ago. They had been taken out of the cork dust, and the bunches had been cleared of any waste berries. They were then put on trays and sold wholesale at 1/ a lb. The white Daria grapes from Adelaide, which are stated to be identical with the Almeria, carried better than any grapes I have yet seen from Australia. They were packed in cork dust, in shallow cases, containing about 25 lb. They sold at 22/6 per case—a splendid price." Equally satisfactory reports from independent sources will be quoted later on concerning South Australian apples and oranges.

An increased area of country is being planted with fruit trees, the horticulturist having been satisfied that he can easily overcome his natural enemies, and that increased transport facilities will help to guarantee to him a regular and profitable outlet for his produce. The following is the official return of the area represented

by "gardens" and "orchards." Vines are not included:—

	Gardens. Acres.	Orchards. Acres.
1884-5	4,942	5,825
1889-'90	5,763	7,437
1890-1	6,626	8,736
1891-2	5,494	8,928
1892-3	5,853	9,918
1896-7	6,669	11,746
1897-8	7,574	13,054
1898-9	7,994	14,396
1899-1900	8,524	15,477
1900-1	8,830	16,001
1901-2	9,005	16,315
1902-3	9,489	17,376

The following shows the growth of the export trade in fresh fruit and South Australian jams:—

	Fresh Fruit. £	Jams. £
1893	21,164	9,671
1894	16,817	15,085
1895	17,299	17,661
1896	19,567	21,548
1897	29,968	20,889
1898	22,211	12,523
1899	32,842	10,063
1900	42,567	16,245
1901	62,662	20,499
1902	37,315	16,783

The Apple Industry.

That South Australia produces apples of prime quality which commend themselves highly to English palates is now admitted on all hands. The growing of what is often called the "king of fruits" is no longer an experiment in this State, nor is the export trade on its trial. The questions which are engaging the attention of producers, merchants, and experts have reference to the best varieties to be cultivated, methods of shipment, and the cheapest and most effective systems for waging war against pestiferous insects. The industry has had its "ups and downs" partly owing to the cultivation of varieties not suitable for distant markets, whilst planters have had to contend against unfavorable seasons. But they have come through these difficulties triumphantly, and now enjoy the satisfaction of having their produce highly praised and strongly competed for by buyers in Covent Gardens as well as at other centres. Our apples, in fact, have established in England a record price for Australia. The manager of the State Produce Depot in the English capital reported a "very marked improvement generally in the selecting, grading, and packing," and this judgment is confirmed by the Victorian produce representative, who has declared that the South Australian apples "invariably reach London in better condition" than those from Melbourne and Hobart." Equally favorable comments have been passed on the quality of our fruit by colonists resident in England, who have critically sampled shipments and closely watched the improvement in quality and methods of packing. The successful inauguration of the industry and of the export trade, having been accomplished, it only remains for old growers to extend their operations under improved methods, whilst encouragement must be extended to those gardeners who have hitherto looked upon the whole business with some amount of scepticism. This is missionary work requiring much tact and patience. Quite recently some of the largest cultivators in our hills districts, viewing the depredations of the codlin moth plus the remedies insisted upon by departmental inspectors, declared that "apple and pear growing are things of the past," and they added, with an emphasis born of conviction, "Certainly no one will plant them while the present regulations remain in force." Mr. Quinn, the State horticultural expert, and other authorities, take a much more hopeful view regarding the suppression of orchard destructive pests. There is ample evidence available that new orchards have been extensively planted, and that growers are well satisfied that a profitable outlet can be found for all the fruit of good quality that they can grow. Mr. Quinn says that "improved attention"—to the regulations for dealing with diseases—"has removed the necessity" in many places for

the adoption of extreme measures. In other words, producers have come to realise that cleanliness, like honesty, is, after all, the best policy, and they are more and more systematically applying methods recommended by the experts to check disease.

The following is an extract from a letter recently received from Hamburg:—"There is a good market here for South Australian apples. They must be yellow or red; no greenish or brown color. We have imported 2,000 cases of Tasmanian apples for the last three years, but we get higher and better prices for the good South Australian apples, especially when yellow or red, and not too many spots. We got up to 20/ per case for New York Pippins (or Cleopatras) whereas French Crabs, for instance, are scarcely to be sold, and do not fetch over 7/ per case." A large exporter of fresh fruit to London has exceived the following interesting information, showing the best paying varieties of fruit to ship, the average being based on the experience of the past season:—Apples—Dunn's Seedlings, 13/4 to 16/8; Rome Beauty, 11/ to 13/3; Stone Pippin, 11/ to 16/; Cleopatras, 12/ to 15/; Jonathan, 11/6 to 14/6; Esopus Spitzenberg, 11/ to 14/; Sturmers, 10/ to 14/; Dumelow, 12/ to 16/; London Pippin, 10/ to 13/; Adam's Pearmain, 10/ to 12/. Pears—Josephine, 12/ to 16/; Broom Park, 12/ to 12/6; L'Inconnue, 12/ to 15/; Vicar of Winkfield, 12/ to 14/; Winter Nelis, 14/ to 20/. South Australian apples are being shipped in increasing quantities to Europe, South Africa, Java, and Hongkong.

Among the Orange Groves.

South Australia possesses some of the finest orange groves in Australia. Those at Renmark are dealt with elsewhere, but orange and lemon culture are not confined to the irrigation colony on the banks of the River Murray. Some of the most productive groves are within a few miles of the city. The gardens in the valley of the Torrens within a radius of ten miles of Adelaide appeal to visitors from over the seas, who never fail to be impressed with the grandeur of the scene and the practical demonstration supplied of the progress of intense culture in South Australia. Deep, ferruginous soil, absolutely free of extraneous vegetation, and so soft that you sink almost to your boot tops; healthy, vigorous trees, bending beneath their rich load; clusters of yellow fruit—all this tells a tale of scientific attention. Admittedly there is money in orange cultivation for those who understand it. There are localities in South Australia which embrace ideal conditions for the industry, and the favored spots are being taken up with avidity. For years planting has been going on apace, and when all the young trees have come into bearing the harvesting of the crop will be a much bigger business than at present. Growers of citrus fruits have been systematically digging up vines and other trees for the purpose of devoting the land to what they believe to be the more profitable undertaking of orange growing. South Australian oranges have found great favor with the Australian consumer, and to the foreign buyer many thousands of miles across the water they are an indescribable delicacy. An English report, dated 21st August, 1903, states:—"London's orange supply, which is particularly abundant for the time of the year, has received during this week a welcome addition in the shape of prime samples from Australia and Jamaica. The Australian fruit arrived in excellent order by the mail steamer Orita, and the pick of the oranges from your end of the world were some magnificent 'navels' from South Australia. These created quite a stir in the trade, for the fruit were so large that in some of the cases there were only 72 oranges all told. These sold at about 18/ a case on the average, and 3/ a dozen for oranges wholesale is quite a phenomenal price. Without doubt the South Australian navels are the finest oranges ever put on Covent Garden market, and though retailers cannot afford to sell them at less than 4/ or 5/ a dozen, it is very certain that fruit of such quality will always command a high price

Orange Tree, 5 years old, bearing 1,400 oranges.

here. The market for such prime goods is, of course, very limited at the prices mentioned, and a shipment of, say, 5,000 or 6,000 cases would in all probability meet with a considerably less profitable market. The South Australian navels are not only fine fruit to look at, but splendid eating. The only fault one can find with them is that the dominance of juice in them renders it undesirable to attack one without arming yourself with a bib or some such protection for your clothes." For several years shipments of the golden fruit—small, certainly, but

typical—were made to the London market, and the fact that buyers there are ever asking for more is unmistakable evidence of satisfaction with the article. In 1897 a few thousand cases were sent to the old country, but in the following year, owing to a short crop, only about 500 cases were dispatched. Then in 1899, when the trees brought forth more fruit, nearly treble that quantity left these shores. The oranges which were shipped to the depot averaged 14/2 a case, but this consignment was by no means a first-class one. Much of the fruit had shrivelled, and the grading was faulty. Since then shipments have been spasmodic, but official reports from the world's metropolis have consistently called attention to the spirited demand which exists for oranges of the best quality, provided they are landed in London between August and the end of the year.

Imports of oranges to England have grown from 4,593,000 bushels in 1893 to 18,250,000 in 1902. Australian growers tested the English market seven years ago and found it highly favorable to the development of an export business. A trial shipment of 1,740 cases of oranges was forwarded from Sydney, and the prices realised ranged from 23/ to 13/3, or an average of 13/8 a case. After the payment of expenses the returns showed a net profit of close on £134. As this was an experimental consignment, the charges were heavy. As yet South Australia is not a large contributor to oversea markets, but there is no doubt that in the near future exports will assume important dimensions. If landed in London between the months mentioned above thousands of cases of Australian oranges would be absorbed, because during that period consignments from other countries, such as Jamaica, Florida, and California, are not forthcoming. One authority estimates that even if 5,000 or 6,000 cases were sent from these ports for several months the London market would not be supplied, to say nothing of provincial requirements.

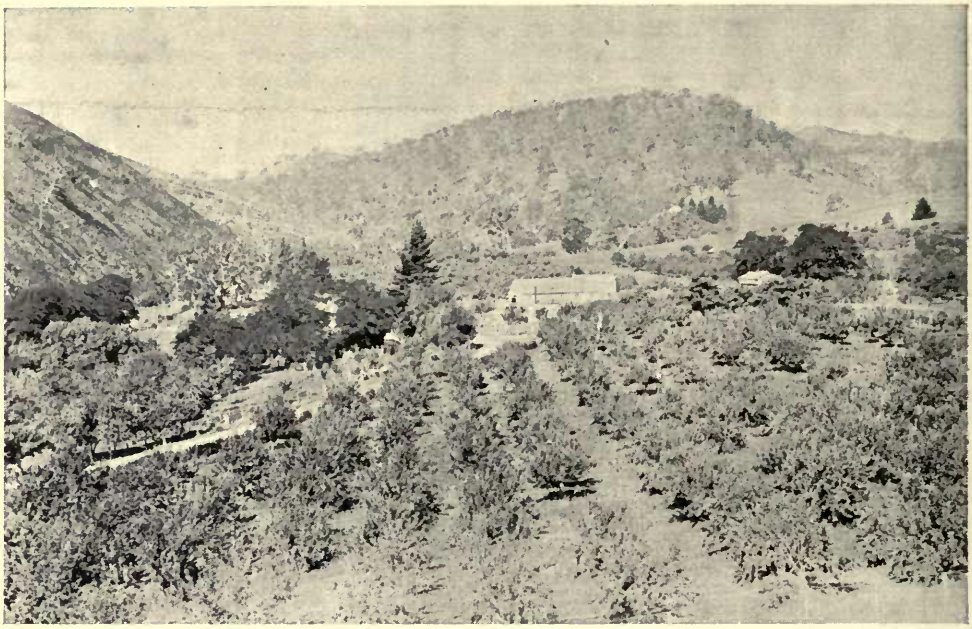
The South Australian industry, however, is making splendid progress, and it is not to be doubted that in two or three years' time markets will have to be discovered for our surplus fruit. In 1895 there were only 73,000 orange trees in South Australian soil; at present there are close on 130,000 trees. When all these have attained maturity thousands of cases of this luscious fruit will be available for foreign consumption. The development of orange cultivation can be gauged from the following figures, which deal with the number of trees planted and the annual yield:—

	Trees.	Cases.
1895-6	73,365	43,817
1896-7	99,098	42,705
1897-8	104,612	46,469
1898-9	106,674	27,520
1900-1	109,490	40,073
1901-2	117,452	58,366
1902-3	127,762	62,814

Under the heading of "Giant Colonial Oranges," the "Westminster Gazette," London, writes:—"The orange supplies, which are particularly varied and abundant for the time of year, have had some welcome additions in the way of prime samples from South Australia and Jamaica. The mammoth Washington Navels have caused excitement in the trade, for the fruit is so large that some of the cases only contain 72 oranges, and they sold at 18/ a package, or 3/ a dozen wholesale. This is a phenomenal price. Other varieties, with 96, 120, and 150 to the case, sold at 14/. Without doubt these South Australian Navels are the finest oranges ever put on Covent Garden Market. The Jamaican arrivals are good, but in no way comparable to the Australian fruit. With 150 and 200 to the case they sold from 10/ to 16/ each. These values are equal to those prevailing for Choice Jaffa oranges, which are now on sale, and are satisfactory."

Lemon Culture.

Lemon trees thrive well in almost any part of the State and considerable attention is devoted to the growing of lemons. The official statistics give the number of trees in 1902 at 67,557, producing 27,057 cases. The manufacture of candied lemon peel is an established industry, and with the prospect of a growing surplus efforts are being made to cure lemons as is done in Sicily, and also for making citric and oil of lemon.



G. Quinn photo. *Orchard at Chain of Ponds.*

Currants and Raisins.

Another industry closely connected with viticulture and fruit-growing is the cultivation of the Zante currant and grapes suitable for raisins. The practice of ringing the currant vine is now largely practised throughout S.A. with gratifying results. Ten years ago some 36 tons was the total production of raisins, whilst last year 500 tons of the local article were put on the market. In 1888 43 tons of currants were produced, and in 1902-3 244 tons. The business is rapidly expanding, and the quality is superior to the imported article. Professor Perkins, in his last annual report, wrote —"Currant-growers have not as yet to look for an outside market; it will, in fact, be many years ere we succeed in supplying even the Commonwealth's requirements. The annual imports of currants into the Commonwealth may be represented roughly by 5,000 tons; whilst the local production of Victoria and South Australia is represented by less than 500 tons. If we admit that the Commonwealth with its rising population is in a posiion to absorb 6,000 tons annually, and assume that the average yield of currants is not ikely to exceed ½ ton per acre, even an area of 12,000 acres under Zante currants would not unduly congest the local market. I have been unable to ascertain the area under currants in Victoria; but, from enquiries made locally, I am able to classify currant vineyards in South Australia as follows: Reynella and Maclaren Vale, 244 acres; Clare and Auburn, 220; Angaston and Tanunda, 286; Gawler River, 5; Yorke's Peninsula, 7; Renmark, 15; Langhorne's Creek, &c., 20; total, 797. We are far yet from the possible 12,000 acres, even admitting that Victoria can show 1,000 acres under currants, which I think unlikely. Currant-growing can be confidently recommend to those who have taste for the kind of work it involves. I know of no more profitable method of utilising good land."

EXPORTS OF SOUTH AUSTRALIAN RAISINS AND CURRANTS DURING FIRST NINE MONTHS OF 1903, COMPARED WITH THOSE DURING THE WHOLE OF 1902.

	RAISINS.		CURRANTS.	
	First nine months 1903. lbs.	1902. lbs.	First nine months 1903. lbs.	1902. lbs.
To New South Wales	162,085	155,890	19,969	27,475
Victoria	1,761	97,091	2,209	23,758
Queensland	69,439	122,194	2,470	616
Western Australia	48,597	95,788	56	—
Tasmania	1,358	—	—	—
Commonwealth	283,240	470,963	24,704	51,849
New Zealand	30,072	12,600	—	—
United Kingdom	—	—	—	—
Other Countries	—	1,310	—	—
Total outside Commonwealth	30,072	13,910	—	—
Total exports	313,312	484,873	24,704	51,849

Harvesting in the South-East—Steam Threshing Machine at work.

Minor Rural Industries.

The climate and soil of South Australia are so favorable to the production of all kinds of grain, fruit, and vegetables that there is practically no limit to what, in a comparative sense, may be classed as "minor rural industries." The term is employed for convenience of classification. Many of the "minor" industries are growing in importance. Clover, lucerne, peas, beans, plants are grown in various parts of the State for the fattening of live stock. Lucerne growing on the Adelaide plains for "topping" up cattle that have travelled long distances from Central Australian cattle stations is becoming a flourishing industry.

With a climate similar to that of countries where the olive flourishes it would, indeed, have been strange if olive cultivation had been neglected in South Australia. Olive oil manufactured in South Australia was sent to the great exhibition of 1851 and gained "honorable mention" on account of "its clearness, color, and flavor." South Australian oil has since that time taken numerous prizes in different parts of the world. It has been officially stated by experts that "no oil that has ever been sent into a market surpasses in quality, lucidity, and creamy delicateness of most delicious flavor the oil that is produced on the Adelaide plains." Sir Samuel Davenport, a high authority and a pioneer in this, as well as in the wine industry, has made the following written statement:—"There being many varieties of cultivated olives whose merits for quantity or quality of oil differ, or whose rank is held in degrees of estimation relatively to national tastes, South Australia has now become rich in the possession of olive stocks of reputation secured to her from Malaga, Gibraltar, and Lisbon; from Cannes, Nice, and South of France, via Marseilles; and from Florence and Bari, via Brindisi. Some skilled French growers of the olive have been introduced, whose labors, and the instruction they must impart to others, cannot but prove of great advantage to the future cultivation and production of the olive. Had South Australia been colonised by Greek, Italian, or French olive growers, it most probably would, long ere this, have produced large quantities of oil and preserved olives for the various markets of the old world. Nevertheless, in many gardens, and in some special plantations of the tree in and about Adelaide, the silvery hue of the undersurface of the foliage, as inverted by the winds, calls strikingly to mind the scenery of well-known localities of its cultivation, as of Cannes or Mentone on the Mediterranean, or of the banks of the Upper Tagus. The calcareous nature of the soil around Adelaide and the warm and dry climate assist in bringing the fruit of the olive, as of the vine, to remarkable perfection; while for the benefit of the laborers, as well as of the farmers, the olive harvest conveniently follows on the vintage as the vintage follows on the harvest time of wheat and other grains." Supplies of olive oil are now drawn from South Australia by the comptroller of navy stores on the Australian station. In 1902 there were 78,000 olive trees, from which 12,000 gallons of oil were made.

The wattle is largely cultivated for its bark, which is chiefly used for tanning purposes. Exports in 1902 amounted to 7,702 tons, valued at £68,850. In addition, large quantities were used locally. Production has risen from 4,372 tons in 1891 to 9,212 tons in 1902.

Mr. J. H. Maiden, F.L.S., Curator of the Technological Museum, Sydney, and Consulting Botanist to the Forest Department, in a pamphlet published in 1891, said: "The broad-leaved wattle of South Australia is one of the richest tanning barks in the world. South Australia has practically the monopoly of this bark, and it is a grand heritage—the envy of the Eastern colonies."

Hops have been cultivated at intervals, and the quality of the produce proved that

soil and climate in favored spots were suitable to its production. The industry during recent years, however, has not shown any signs of expansion.

The same may be said respecting the cultivation of tobacco. The plant grows well in a few places, but the cost of labor has so far been against growers.

Figs thrive luxuriantly, but up to the present very little attention has been paid to the business of drying. Quite recently, however, the Smyrna fig has attracted notice, and the success achieved in California in "caprification" by the introduction of the fig wasp, which accomplishes this necessary function, is being closely watched with a view of establishing the industry. A few years ago Mr. W. C. Grasby visited Smyrna as an honorary Commissioner of the South Australian Government, and studied the fig question on the spot. Mr. T. B. Robson, of Hectorville, has already a large number of the true varieties, and has arranged for the introduction of the fig wasp at once.

The drying of various kinds of fruit and the making of jams are important industries, and quite a number of factories exist in South Australia. The sun-drying of raisins and currants is largely resorted to, more particularly at the irrigation colony of Renmark, where "acres" of drying trays may be seen in the season. South Australian jams have been supplied to the War Office and the navy stations, and large shipments are regularly made to South Africa and various parts of Australia. The quality of South Australian dried fruits and jams is excellent.

Bees do well in almost any part of the State. At present there are 20,000 hives producing about 1,000,000 pounds of honey annually.

There are three experimental date plantations in South Australia under State control. These are making good progress, the dates grown being of good marketable quality.

Exception will be taken in some quarters to the classification of poultry breeding, and the egg trade under "minor" industries. It has outgrown that limitation, but without going into details of breeding fowls for egg-production and table purposes, there remains little to be said in a general way. Poultry is one of the leading "by products" of the farm in this State. There are several poultry farms conducted on a large scale, and fanciers are frequently making valuable importations. Both in the matter of egg-production and the export of frozen poultry the industry promises to grow to considerable importance. Mr. R. W. Skevington, the manager of the Produce Export Department, in his last annual report, wrote:—"The poultry trade is gradually increasing. Paying prices for good young poultry can be secured in London from February to June. In every district of this State increased activity is being displayed in the raising of poultry, and it is expected that definite steps will be taken next year to open up a trade that will be profitable to South Australian breeders." The following shows the value of the eggs exported in the years stated:—1890, £44,204; 1891, £48,554; 1892, £27,771; 1893, £26,575; 1894, £22,679; 1895, £27,275; 1896, £40,353; 1897, £50,034; 1898, £55,719; 1899, £62,493; 1900, £73,679; 1901, £73,520; 1902, £107,739. The shipments of frozen poultry has increased from £42 in 1898, to £2,805 in 1902.

Within the last few years increased attention has been devoted to the breeding and fattening of pigs. Some well-appointed piggeries are to be found in various parts of the State, and there has been a steady increase in the number of bacon factories. The export of South Australian bacon and hams in 1902 amounted to a value of £32,628. Shipments of South Australian preserved meats were worth £27,000.

Our Irrigation Colony.

> And the wilderness shall put on the glory of a fruitful garden; the desert shall be made to blossom as the rose; the dry land shall laugh with gladness; the valley shall be filled with joy; the husbandman shall reap the increase and enjoy the fruits of his labour under his own vine and fig tree.

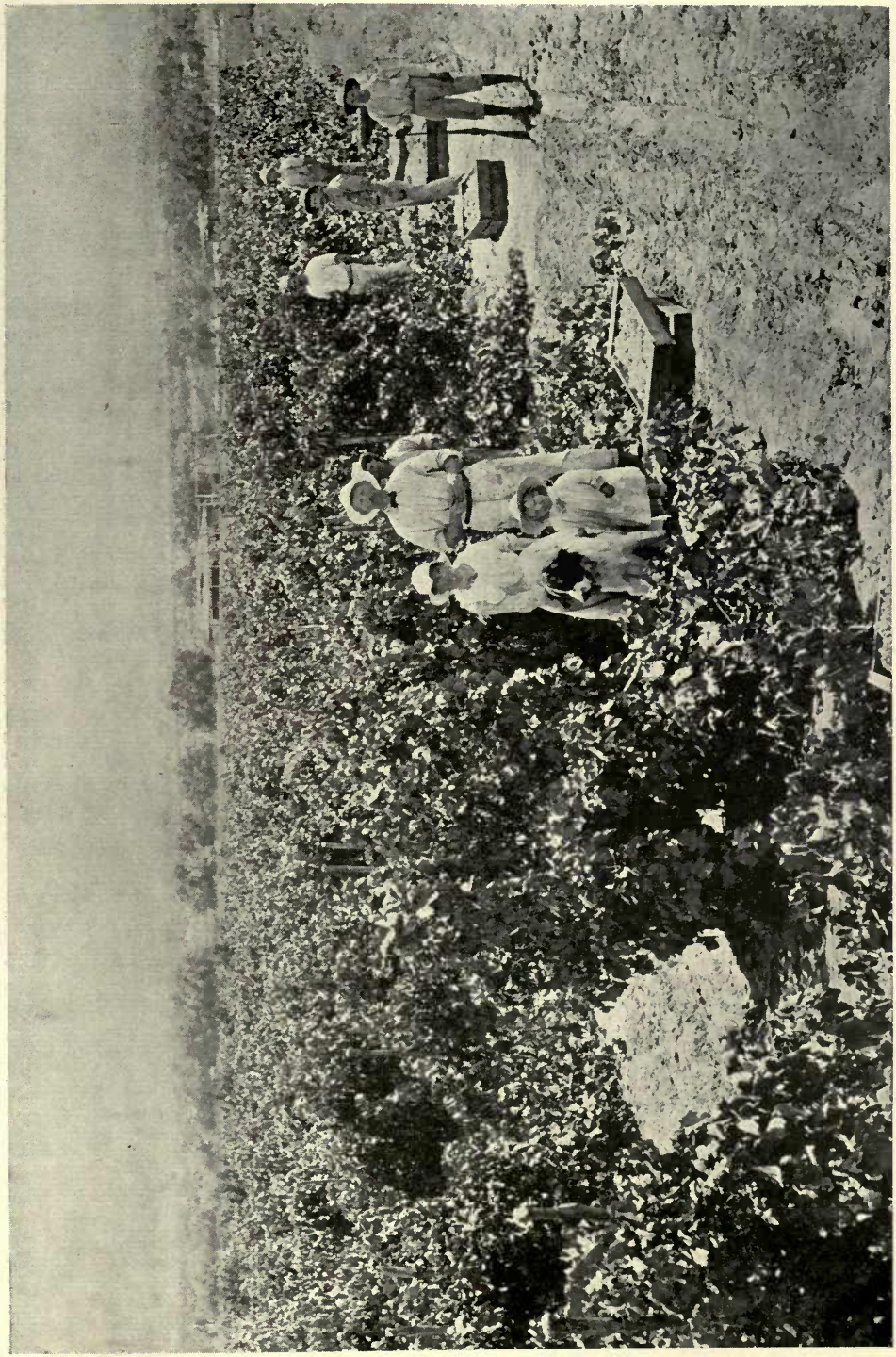
All this has come to pass at Renmark, the irrigation colony of South Australia, situated on the banks of the River Murray. As you visit one block and then another—transformed in the space of a few years from a barren waste into gardens of loveliness—you feel that Rabelais in his valley had not more reason to be happy than the men whose lot has been cast in such pleasant places. The lands assessed to the Irrigation Trust which controls the colony comprise about 3,600 acres, and consist of apricots, 842 acres; peaches, 122; citrus, 318; vines, 1,380; lucerne, 616; olives, 35; sundry fruit, 11, and cereal, 479 acres. The blocks are situated to the west of the township spread out in the shape of a fan. To see the fruitful orchards—great orange groves and long avenues of fruit trees and vines—you must get among the ribs of this fan and skirt round the edges of it. At the handle of the fan is No. 1 pump, a fine piece of machinery capable of spouting forth 1,620,000 gallons per hour. The main channel—which can be fed from the stream by gravitation during periods of high river level—starts out in a northerly direction gradually curving inwards west and south, forming reservoirs for pumping stations en route and ultimately enclosing the whole settlement. There are several main channels and a number of secondary conduits. Every block is connected. An open furrow within each garden allows the water to gravitate along each row of trees and provide the required moisture at the will of the owner. The country in its natural state consisted of low mallee scrub, with a few blades of grass, fighting for a miserable existence, and sand shifting from place to place at the caprice of every breeze. Cultivation and irrigation have worked a marvellous change, and the transformation is wonderful to behold. It forcefully illustrates what can be done in Australia by a combination of water, soil, and sunshine. These elements are always available. At the irrigation colony they are regulated, and the result is that nature yields her fruit in abundance. An area of 3,600 acres is maintaining 1,000 persons, and last year produced a crop worth £35,000. The same land, without irrigation, would not have been able to carry 500 sheep!

The rich, sandy loam to be found in many parts of the settlement is said to be equal to the best Californian lands where irrigation has been profitably carried on for many years. It is easily cultivated, and retains the moisture for a considerable time. In other parts of the settlement the soil is of a heavier quality, and requires more working, but is splendidly adapted for muscatels, which bear very heavy crops. The water used in irrigating is well supplied with organic and inorganic matter, which makes it an excellent fertiliser.

An ounce of fact is better than many pounds' weight of theory, and statistics of production are, after all, the best test to apply. The figures showing exports of produce from Renmark for the past seven seasons in sterling value are as follows:—

	£
1895	6,878
1896	7,398
1897	16,869
1898	11,968
1899	18,167
1900	22,086
1901	28,167
1902	35,000

These figures were from actual returns obtained from apricots, peaches, nectarines, currants, sultanas and raisins,



A Vineyard at Renmark—Sultana Vines, 3 years old.

C. Reiners photo. *Colonel Morant's Apricot Orchard, Renmark.*

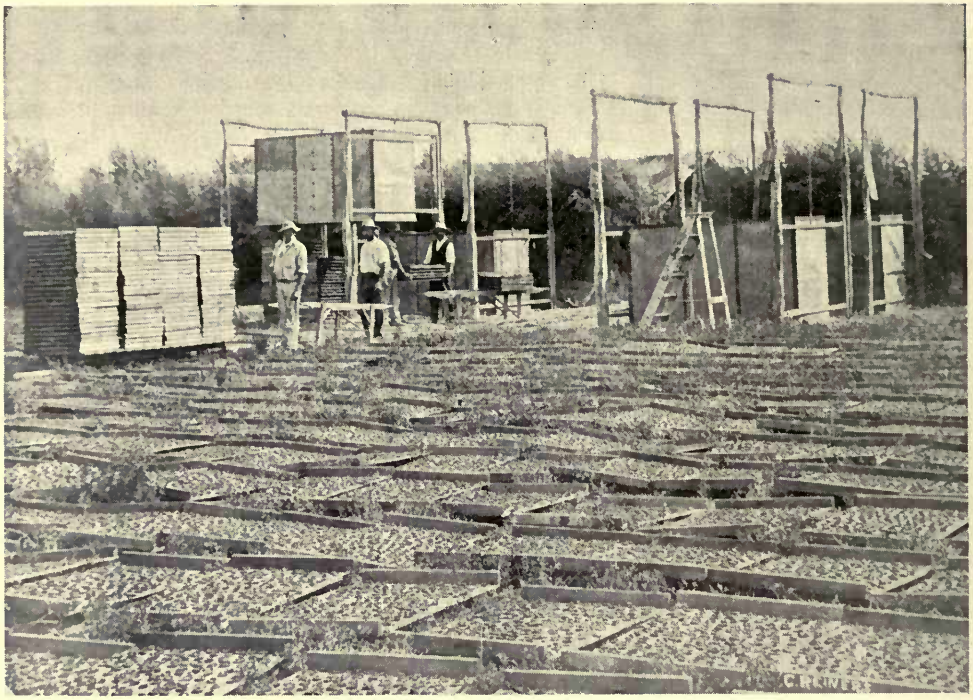
oranges, and lemons. Could facts be more eloquent? They show steady substantial progress, and the outlook gives promise of a further good increase for next season. There is a general disposition to plant further areas, especially with oranges and sultana and muscatel vines. With climate and soil suitable, and an ample supply of good water, cultivation and care are alone required to guarantee a maximum production. As one appreciates all that Nature does for the place, and watches the water intended for irrigation purposes coursing down the channels like small rivers, it is easy to understand the remarkable results obtained at Renmark, why the oranges, for instance, are unusually large and of such delicious flavor, and how the dried fruits and olive oil from the irrigation colony have been so successful at the Royal and other shows.

The local government of Renmark is constituted in what is known as the Irrigation Trust. The members of that body are charged, by Act of Parliament, with the duty of raising and distributing water in the horticultural areas, its expenditure being met by a uniform yearly rate of £1 per acre, payable on assessed lands whether watered or not. A gentleman with extensive experience in California, in evidence given before a Royal Commission, stated that the water rate and labor were cheaper at Renmark than in California. He added:—"Vineyards of three year's age in Australia, well watered, are better than three years old in California, and when you get on to six years old it will be just about the same, but there is an advantage in Renmark over California and Florida." The Irrigation Trust has District Council powers over the horticultural area; but up to the present the township area is without organised control. There is, however, a movement proceeding to obtain a Town District Council. The Trust Act of 1893 provided for a loan of £3,000, and that of 1900 for a loan of £16,000. This advance of £19,000 was in order to make good the deficiencies of construction in plant and works as left by Chaffey Bros., Ltd. This money has been admir-

ably expended by the Trust under the supervision of the Government, and a special rate is about to be struck for the repayment of the first instalment of the loan. The pumping plant is in most efficient order, due provision having been made for duplicating or breakdown, and the channelling, where needed, has been well cemented. This cementing has stopped the seepage which was doing a good deal of harm on the lighter land of the 60 ft. level.

Experience has proved that the raisin grower got his returns first, and has done well all along. It is not too much to say that the Gordo Blanco raisin has seen Renmark through her troubles. Apricots have grown into a standard market demand and value. Peaches and nectarines are in small demand, relatively, as a dried fruit, and the area so occupied is at present limited. Otherwise the same remarks apply to them. The sultana has of recent years come greatly into favor. The capital cost of planting this variety exceeds that of the ordinary raisin vine on account of trellising, which takes the cost up to about £10 per acre. They are more costly to work owing to the trellis, and the need of increased hand labor to keep weeds down. This also applies to currant vines. Their planting has hitherto been limited; but since the process of cincturing has become established, producing quite wonderful crops, many more acres have been planted. Oranges like Washington Navels, Malta Bloods, and Compudas, and, indeed, ordinary kinds as well, are good property, and the market results have always been good. Growers are not troubled with scale or other tree disease, and, although in the past the cultivation of the lemon has not, owing to market conditions, been completely satisfactory, the future is more hopeful. A fair trade has been done with West Australia and South Africa. The superior claim of Renmark is its climate, added to the fertility of the soil. Abundant crops of good fruit are produced, and they can almost invariably be dried with very little hindrance from weather. In proof of this it is important to note that no evaporator of any kind has ever been seen on the settlement. All the fruit is sun-dried.

C Reiners photo. *Picking Zante Currants at Renmark.*



C. Reiners photo. *Sulphuring Plant and Drying Pans, Renmark.*

A Second Fruit Colony.

The Coonawarra fruit colony at Penola, in the South-Eastern portion of the State, was founded about ten years ago by the late Mr. John Riddoch, who set aside a portion of the Yallum estate for the experiment. Two thousand acres were surveyed and cut into small blocks of 10 to 15 acres. Settlers were charged £10 an acre for the land, and were given 10 years in which to pay it, 5 per cent. interest being charged on the balance due. Many of those who took up land have bought straight out through the medium of the State Bank, enjoying the benefits offered by that institution in the shape of lower interest, and the system of paying off the principle and interest together over an extended period. Anybody visiting Coonawarra at the present time cannot fully appreciate the uphill struggle which most of the colonists have had to make during the last 10 years. Some of the settlers went into the enterprise with insufficient capital, and the period of waiting for the fruit trees to come into bearing proved too much for them, and the inevitable happened. Those who have been able to remain and work their land are now beginning to reap some reward for their labor and fortitude, and the impression created by a tour of the vineyards and orchards at this time of the year suggests that success is within measurable distance for the industrious husbandmen. There are about 18 families settled at Coonawarra at the present time, and several instances were supplied of where two brothers have taken up blocks, and the one is out working, earning a little money to keep the pot boiling, while the other brother is bringing the orchard into full bearing. One of the largest gardens is that of Mr. Darwent, consisting of 22 acres under vines, 26 acres under apples, and 15 acres under soft fruits. Mr. Darwent ships his apples to England, Java, and the Continent.

Among the varieties of apples grown at Coonawarra are Cleopatra, Cox's Orange Pippin, Five Crown (London Pip), Rome Beauty, Nickajack, Scarlet Nonpareil, Jonathan, Newtown Pip, Stone Pip, and Roakewood. The variety of peaches includes Brigg's Red May, Early Silver, Royal George, Merchant Campbell, Dr. Hogg, and Lady Palmerston. The varieties of apricots are Oullin's Early, Moorpark, and Hemskirk. The plums include Green Gage, French Prune, Felamburg, Prime Pons Seedlings, and Coe's Golden Drop. The Coonawarra fruit colony is looking well, the trees and vines having a healthy appearance, and promising good crops.

The soil at Coonawarra might be described as being of a chocolate loam in some places and a lighter sandy loam in others, with a limestone formation running throughout the colony. The country in the vicinity of Coonawarra is what some bushmen describe as "pockety," and these little depressions in the land generally represent the richest patches. There is an average rainfall of 27 inches during the year, and water is obtainable anywhere at a depth of from 12 to 15 feet. Irrigation is not required, owing to the splendid rainfall and the good supply of water so near to the surface; and this, of course, is a great advantage, and represents a substantial saving. Ever since the fruit colony was founded Mr. Riddoch has given every possible encouragement to the settlers, and to serve as an object-lesson he planted about 250 acres with vines and fruit trees on his own estate. Of this area about 139 acres are under vines. All the grapes growing in the settlement are carted to the wine cellar, and the settlers are now receiving very good prices for these, and there is a tendency to increase the acreage of several of the vineyards.

The wine cellars at Coonawarra are an adjunct of the fruit colony, and they represent a profitable outlet for a portion of the produce raised by the settlers. Mr. McBain, who was for some time assistant viticulturist at the Roseworthy College, is manager of the cellars, and his experience has enabled him to bring the accommodation quite up to date and supply it with all necessary appliances. In 1901 53,000 gallons of wine, practically all claret, were

C. Reiners photo. *Willow Channel, Renmark.*

C. Reiners photo. *A River Steamer, River Murray, discharging cargo.*

made, and this was more than double the vintage of any previous season. The make in 1902 was about 80,000 gallons, and in order to provide for this the cellars have been enlarged and the storage capacity increased to about 180,000 gallons. The vines throughout the Coonawarra colony are bearing exceedingly well, and the grape crop promises to be the largest yet gathered in the district. The yield was as large as 2¼ tons of Cabernet Sauvignon and 3 tons of Shiraz to the acre last season, which speaks well for the climate and other natural conditions of the district. The claret made at Coonawarra has already secured a good reputation, and the consignment sent to London realised top prices, 3/9 per gallon having been obtained for it. This claret is of good quality, and possesses an agreeable flavor and fine bouquet. Last year the growers received at the rate of £7/10 per ton for Cabernet Sauvignon, and £4/10 for Shiraz grapes, prices which paid them very well. The Coonawarra vinegrowers have had the advantage of the experience of the older vine-growing districts, and have only planted the most approved kinds for red wine, viz., the Cabernet Sauvignon and Shiraz. Some years ago Messrs. Thomas Hardy and J. H. Foureur, a native of Epernay, paid a visit to the district, and were both of the opinion that the nature of the soil and subsoil and the climate were all in favor of the production of champagne, and recommended Mr. Riddoch to plant the Pinot Noir, one of the best champagne grapes. Mr. Riddoch acted on the advice, and put in 30 acres of that grape; but the growth was disappointing, and they were nearly all uprooted, and now only a few vines of that variety are to be seen.

The orchards and the vineyards are now coming into full bearing, and there appears to be every reason to believe that the Coonawarra colony will prosper, and that those settlers who have "come through the fire" will be all the better for the experience. The results now being obtained at Coonawarra indicate the possibilities of a practically new industry for the South-East, and from a vigneron's point of view the country has advantages which are not to be found in less favored parts of the State. The natural resources of the great district of which Penola is the centre are considerable. Some of them have still to be discovered; others have yet to be fully utilised.

The Dairying Industry.

While it cannot be denied that the conditions which obtain in South Australia are not wholly favorable to the development of every branch of dairying, the State is favorably placed in many ways so far as the manufacture of butter and cheese are concerned. A reputation for a choicely-flavored article was long ago won by the producers, and during later years it has been further improved, until now the monetary value of the industry has assumed important and prosperous dimensions. This happy position must be attributed to the remarkable capabilities of our soils, the strong nutritive herbages and grasses which form a rich natural food for milking stock and the beneficial character of the climate, combined with intelligent and painstaking zeal on the part of the modern dairyman. Dairying in South Australia dates back to 1885, when the factory system was inaugurated. It was expected that the introduction of modern methods would arouse opposition, but the practical sagacity of the dairy farmer and a commendable readiness to adopt scientific principles led to the movement being established on a firm basis. With a vigor and determination worthy of their fathers, the first settlers on the soil, the pioneer dairymen applied themselves to the new work. Rapid development followed. In 1892—that is, within seven years—25 factories were in operation. At present there are 68 up-to-date butter and cheese factories and creameries.

A significant feature which promises well for this industry is a splendid record of progress achieved in the northern areas where severe and often erratic climatic conditions prevail. The cow, in fact, has proved the salvation of many farmers in drought-affected localities, and the returns from the dairy have more than compensated for general expenditure and losses made in other directions. "Give us enough feed for a few cows and fowls and we can live comfortably. The rest is profit." So said a farmer on a recent occasion. An eminently satisfactory fact is the superior butter-fat quality of the milk supplies, while the attractive aroma in the cream and butter is substantial proof of the improved methods adopted by the factories. The milking herds are yearly receiving more attention, and the standard of quality is being raised.

The general suitability of our climate for dairy farming affords scope for a still wider expansion of producing operations. In the south and south-eastern portions of the State where the rainfall exceeds 30 inches, and where the soil is above the average, intense culture is being practised and with its extension the milking stock will be comfortably reared at a correspondingly smaller cost. In the volcanic country near Mount Gambier the ideal home of the dairyman is to be found, and it is questionable whether more favorable natural conditions are to be found in Australia. It is in this part of the State where the Hon. George Riddoch, M.L.C., one of our most enterprising stock owners, has introduced the system so successfully practised in the western districts of Victoria—dairying on halves. Mr. Riddoch has set aside a portion of his valuable Koorine Estate, dividing it into handy size farms. He supplies the cows, plant, houses, &c., the dairymen finding the necessary labor. The plan is proving mutually satisfactory and profitable.

An important feature of the industry is the wealth of natural herbage which grows with luxuriant vigor in many parts of the State. The rich nutriment contained in the native grasses during the warm months of summer is calculated to astonish the visitor by its rapid fattening properties for milking and other stock. Cows grazing on the plains and undulating lands yield milk of magnificent flavor, producing butter of remarkably dry texture, and unexcelled in any part of the world. Maitland Charlotte, a champion Jersey cow belonging to Mr. Alick. Murray, produced over 17 lb. of butter per week 8½ months

A Dairy Farm at Koorine, Kalangadoo, the property of the Hon. Geo. Riddoch.

after calving, when her supply of food consisted solely in what the animal found in the paddocks. Leading dairy farmers do not allow their stock to entirely depend upon natural grass, but supplement with sweetly-flavored nutritious wheaten hay. Bran and meals are liberally fed, and considerable quantities of copra or cocoanut cake are also consumed.

In the production of fodders great attention has been devoted to the cultivation of lucerne. At present about 13,000 acres are under cultivation, or an increase of 6,000 acres on the figures for 1890. Sown grasses have also commanded the enterprise of the agriculturist, and 25,000 are under crop. The turning of green crops into ensilage has also received attention. Official statistics of the last two years show an increased storage of 1,937 tons. The quantity has exceeded 150,000 cubic feet, and a rapid extension of this branch is bound to take place. Many other crops are cultivated in extent according to the suitability of climate and rainfall. Among these are peas, rape, kale, cabbages, clover, maize, sorghum, and mangolds. In one of the five volcanic districts over 60 tons to the acre of mangolds have been produced without the aid of manure.

South Australia is strong in stud cattle, and several breeders have done great service for the dairying and agricultural industries of the State by producing and importing high-class animals. Throughout the milk-producing districts the profits of the Shorthorns for milk and beef production testify to their value for all-round dairying purposes. These splendid cattle lose none of their characteristic features here, and probably a more congenial climate for them could not be found anywhere in the world. Jersey stock are also well represented, and the exhibition of those famous "butter churns" at our agricultural shows supplies conclusive evidence that neither expense nor attention are wanting in connection with the importation and maintenance of the breed. The Jersey is a popular animal in South Australia, and few herds are without a sprinkling of the blood. The value of this cow in the advancement of butter production cannot be accurately assessed, and it has been adequately demonstrated that the breed reaches great perfection in our climate. Dairymen are rendering admirable service by proving the value and importance of the Shorthorn-Jersey cross for dairying purposes. Ayrshire cows are not particularly favored, but representatives of this, as well as the Holstein breed, are to be found in the State.

In order to advance the industry the Government has from time to time imported specimens of Jersey and Ayrshire

stock, the majority having been selected for the Government by Mr. Alick. Murray. These animals were placed under the care of the Agricultural Bureau. This attempt to improve the dairy herds of the State, though not a pronounced success, was not without some good influence.

The latest statistics show that there are in South Australia 75,011 milch cows distributed as follows:—Central Division, 41,174; Lower North, 16,187; Upper North, 15,322; South-Eastern, 10,211; Western, 1,620; outside districts, 463.

The quality of the milk supplies in South Australia is declared by experts to be liigh. Latest factory records for a year show the high percentages of butter fat in two samples:—

	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.	3·7	3·7	4·1	4·3	4·1	4·1	4·1	4·0	4·0	4·0	4·0	3·8	3·7
2.	4·0	4·1	4·2	4·2	4·1	4·1	4·1	4·0	3·8	3·8	4·0	4·2	4·4

These figures represent experiments conducted at two of the largest factories in the State, and a third factory, with 62 suppliers, gives an average for the year of 4.4 per cent. of butter fat. A number of dairymen were credited with an average exceeding 5 per cent. at different months in the year. It is not uncommon for a factory to produce a month's yield of butter with an average of less than 20 lb. of milk for a pound of butter, while it is on record where a dairy farm fell to 17.4 lb. of milk for a week's supply from a herd of six cows.

Instances are to be found of cows yielding milk with over eight per cent. of fat, and five per cent. is of common occurrence. The butter made in South Australia is of excellent flavor, a fact largely due to the educational work carried out by the able Government dairy expert, Mr. G. S. Thomson, F.R.S.E., who distributes reports embodying the merits and demerits of the tests conducted at the Produce Depot prior to shipment. Under his guidance valuable experiments have been made, and to-day our dairy farmers are able to market a product embracing many attractive features. At our agricultural shows the display of dairy produce commands admiration and the unbiased judging of the Victorian expert at the expositions under the auspices of the Royal Society has strengthened the high position held by our butter makers.

The rapid means of transit provided by modern ocean steamers, with their spacious refrigerating chambers, have enabled our producers to place their article on foreign markets in first-class condition. Unfortunately continuous shipments were interfered with, but the product has won considerable favor with over-sea consumers. The following figures, showing exports, illustrate the progress of the dairy industry and its monetary value to the State:—

Year.	Butter.		Bacon and Hams.	
	Cwts.	£	Cwts.	£
1890 ...	3,798	16,100	789	2,891
1891 ...	4,269	21,408	413	1,311
1892 ...	1,901	9,851	172	632
1893 ...	5,757	20,693	105	425
1894 ...	13,774	54,080	296	898
1895 ...	15,477	70,459	1,073	2,869
1896 ...	5,404	26,194	1,597	5,051
1897 ...	1,484	6,879	813	2,942
1898 ...	6,869	28,007	411	1,745
1899 ...	12,520	61,470	1,950	6,495
1900 ...	10,210	51,173	2,968	9,069
1901 ...	3,118	17,620	2,648	9,329
1902 ...	3,692	23,230	7,789	32,628

In cheddar cheese production the State holds a creditable position, and a wide and profitable expansion must eventually take place. Owing to the demand being in excess of the quantity manufactured, an export business with England has not yet begun. The richness of the product and its general characteristics have gained the public confidence, and this, no doubt, is mainly responsible for consumption being confined to our own State. A series of comprehensive experiments conducted by the Dairy Expert two years ago gave ample proof of the successful carriage of cheese from South Australia to the British market. A consignment was despatched to Glasgow, and was tested there when eight months old. The practical and scientific reports received from the highest authorities who made the examination in Scotland were highly complimentary to the State, and it will not be out of place to give the fat analysis of four samples. When it is considered that an average British cheese contains about 32 per cent. of fat, the superiority of our

A Dairy Farm in the South-East, the property of the Hon. Geo. Riddoch, M.L.C.

experimental shipment is all the more apparent. The percentages were as follows:—43.95, 39.81, 39.50, 40.74.

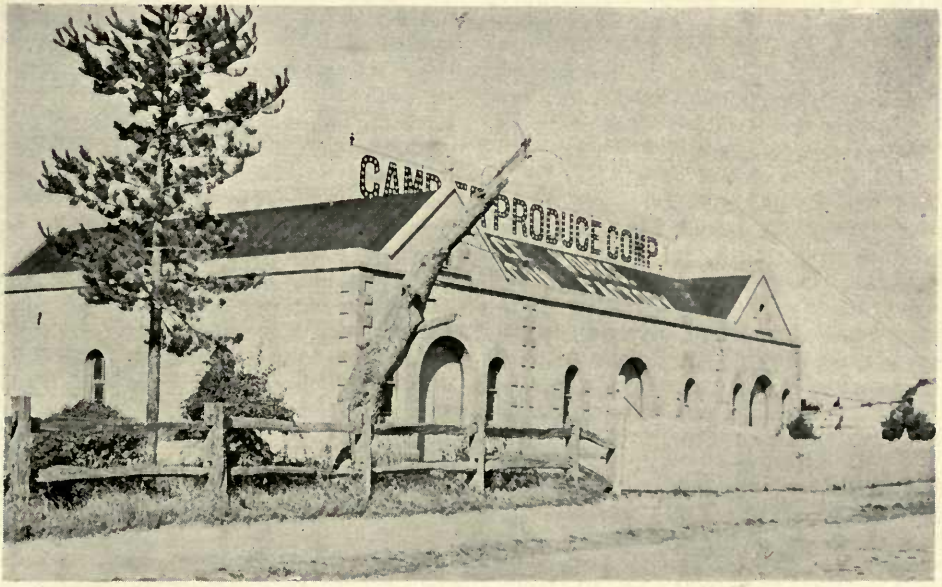
The following shows the quantity of butter and cheese manufactured since 1896 and the number of milch cows in the State:—

Year.	Milch Cows.	Butter. lbs.	Cheese. lbs.
1896 ...	84,255	4,616,675	907,123
1897 ...	73,524	3,900,118	849,845
1898 ...	76,709	4,559,683	923,123
1899 ...	83,527	5,581,231	946,930
1900 ...	75,942	5,525,606	1,030,680
1901 ...	74,995	4,954,523	1,053,160
1902 ...	75,011	4,521,246	705,969

Fifty per cent. more butter was made in 1896 than in 1892. The actual quantity specified was 4,616,675 lb., as compared with 3,110,093 lb. The cheese made was 907,123 lb., against 661,314 lb., or 37 per cent. additional. In 1898 the quantity of butter made was 4,559,683 lb., and of cheese 923,123 lb., showing increases of 659,565 lb. and 73,278 lb. respectively. In 1899 the quantity of butter returned was 5,581,231 lb., the highest recorded, and an increase of 1,021,548 lb., or 22 per cent. on the previous year. Of cheese the output increased to 946,930 lb., or 3 per cent. additional. In 1900 the quantity of butter made was 5,525,606 lb., in 1901 4,954,523 lb., and in 1902 4,521,246, the seasons being less favorable. The average output for the last five seasons has been 5,028,457. The output of cheese increased from 1,030,680 lb. in 1900 to 1,053,160 lb. in 1901. In 1902 the quantity was only 705,969 lb. The average for the last quinquennial period was 960,748 lb. Owing to the drought only 605,301 lb. of butter, value £26,194, were exported in 1896, and in 1897 but 166,213 lb., value £6,879, from the same cause. In 1898, however, 769,393 lb., value £28,007, were shipped. In 1899 the quantity of butter exported was 1,402,261 lb., an increase of 80 per cent., and of the value of £61,473, showing 120 per cent. more. In 1900 shipments were 1,143,473 lb., representing £51,173 in value, in 1901 only 349,178 lb. of £17,670 value, and 1902 413,504 lb. of £23,230 value. The total export of South Australian butter during the last 11 years has amounted to 8,983,305, of £369,709 value.

There is no branch of agriculture more dependent upon the assistance of science to promote its success than dairying. The work of the dairy factory and the great advance of technical education during recent years have revolutionised the manufacture of butter and cheese. A knowledge of bacteriology is of the highest

Portion of Churning Room, A. W. Sandford & Co.'s Creamery.



Gambier Produce Company's Freezing Works, Mount Gambier—A. W. Sandford and Company, proprietors.

value to the youth who enters upon a course of training in order to fit himself for the responsibilities of dairy management. Indications of earnest endeavors on the part of the State to thoroughly equip him are everywhere apparent. At the Agricultural School, the preparatory institution, the student is first taught the rudiments of dairy science and practice, and at the conclusion of his elementary training he passes into the Agricultural College for the higher courses. Here he is brought into contact with the practical part of his duties, having to assist in the operations of the farm and dairy, and on the more scientific side give his attention to the work of the chemical laboratory. When he has completed his studies the young man has a knowledge which enables him to undertake the difficult work connected with factory management. At this stage in his career he is not left unaided, for the Dairy Expert attached to the Department of Agriculture visits the leading centres and conducts demonstrations on any branch of work desired by the manager. Matters demanding careful investigation, such as taint in milk, butter, and cheese which involve the farmer and factory in heavy loss, receive attention, and at the conclusion of his enquiries the expert issues printed information dealing with the cause of the trouble, its action in the produce, and methods to obviate it. A fully equipped laboratory is attached to the department where scientific work in all its branches is carried out, from the testing of factory thermometers to the bacteriological and chemical examination of samples of dairy produce.

The practice of dairying is not omitted in the teaching curriculum of the Agricultural Department, for meetings are arranged in any district throughout the State, and lectures are delivered to the dairymen on subjects in keeping with the requirements of their particular part of the country. Visits are also paid to the State Schools, where the expert delivers short, practical addresses to the children, who take a keen interest in what is said to them. An improved system of judging, too, in connection with the agricultural shows has been adopted. The good and bad features of each exhibit are detailed in a list of points showing where the defects lie, and how readily they may be noticed in comparative observation.

A reference to dairying would be incomplete that failed to acknowledge the splendid pioneer services rendered to the industry by Messrs. A. W. Sandford & Co. In the seventies this firm started the first bacon-curing works on factory lines at Mount Gambier and Port Adelaide, and although supplies were scarce in those days, and importations had to be resorted to from Victoria, the business has made such strides that now quite a number of factories are in full swing, not only at Mount Gambier, but in the hills close to Adelaide, resulting in the State being self-supplying, and also doing a very fair export business with our neighbors in Broken Hill and Western Australia. In dairy machinery this firm, quickly recognising that there was an opening for a new branch of industry, started manufacturing dairying appliances. A number of hands are employed by them building and fitting churns, and the many other appliances that are so essential to a dairy and butter factory. The most important development in the line has been the starting of the creamery system, which is evidently much appreciated by the farmers, judging by the large quantity of cream forwarded daily; and is an especial advantage in a country like this, where the holdings are invariably so widely scattered. Throughout the areas dairy farmers have adopted the separator, which enables them, after separation, to secure the wholesome sweet skimmed milk for fattening purposes, whilst the cream is forwarded on to the central creamery in the city, where there are extensive freezing rooms for its cooling and churning into butter.

The Wine Industry.

"Our wines as a class are undoubtedly superior to the bulk of the European wines, and are, therefore, well able to hold their own on the markets of the world." This is the opinion of Professor Perkins, the Government Viticulturist, and it has been confirmed by leading authorities in Europe, as well as experts in Australia.

Viscount Des Garets, a champagne maker of Epernay, France, visited a number of South Australian cellars in July, 1903, and when in Western Australia on his way back to France, he publicly made the following statements:—"Some of the best wines I have tasted in Australia were those of South Australian production. I am taking several cases of claret, white wines, and brandy to France with me. Before many years the French market will be killed out, and I am quite sure that the export of Australian wine will improve day by day and year by year. Many of the ideas employed by Australian wine-makers came from their own heads. These young countries can teach the older places many things, and I have learnt some ideas which I will put into practice in France. My countrymen do not travel enough; there is always something to be learned in the changed conditions of younger countries. I intend to tell them that when I get home, and persuade them to come and see what Australasia has to show. Land, land, land everywhere, and out here I see the best means, not to become wealthy, but to live very comfortably and make money. It is a great mistake for the old countries not to send more people out to these places. Land is to be had cheaply, and I think the French farmer comes out on top of the list. I will speak about these things when I get home."

The high quality of the South Australian product is commanding increased appreciation in foreign markets. There has been a vast amount of prejudice to overcome, and an uphill fight to secure a footing in conservative trade circles, but these difficulties are gradually passing away. The viticultural expert of the State has affirmed that with due care there will be no difficulty in placing wine-making in the front rank of the revenue-yielding industries of this State. There is no room for doubt concerning the suitability of South Australian soil and climate to the growth of the vine. There never was from the time that the first vine cuttings were imported.

"With the wonderful climate of Australia," wrote Dr. Taylor many years ago, "with its volcanic and other weathered soils full of potash, iron, and other vine food, it would be surprising indeed if Australia were not supplying the world with 'wine that maketh glad the heart of man' long after the worn-out vineyards of the Old World have succumbed to horticultural starvation and entomological ravages." "Experience has shown," says the State Viticultural expert, "that South Australia is pre-eminently suited to the growth of the vine; and that the manufacture of a good sound wine, capable of holding its own in the world's markets, can readily be obtained from a large portion of our agricultural areas." The vine flourished in South Australia from the first, and wine made with the most primitive appliances was pronounced by connoisseurs to be of excellent quality. Governor MacDonnell, writing to a friend in 1859, said: "I have lately been going through the dozen duplicate samples of wine you sent me from Tanunda, and at least eight of them are excellent. I have been quite surprised at their quality; but I have no doubt this country will be a good wine-producing country. People are setting to work energetically planting vines in all directions, and in four years I have no doubt we shall obtain a tolerable footing in the English market." "With time and care Australia ought to be the vineyard of the world," said Sir Charles Dilke in his "Greater Britain," written after his visit to these lands in 1867. He continued: "The Colonial wines are excellent,

better indeed than the growths of California, which, however, they resemble in general character. The Albury Hermitage is a better wine than can be bought in Europe." South Australian wines have improved out of all knowledge since Sir Charles Dilke expressed his views. Mr. P. B. Burgoyne (the London-Australian wine merchant), after a visit to this State, declared:—"The wines of South Australia as a whole are a great improvement on those which I tasted in 1893. I find the types exhibit a distinct individuality, and I have tasted wines with an elegance and finish not surpassed by other wine-growing countries. Of this you might indeed be proud." The London "Times," in 1887, stated that Mr. Richard Bannister, in reporting on the subject in connection with the late Colonial Exhibition under the auspices of the Society of Arts, emphasises the fact that soil and climate in many parts of Australia are eminently suited to certain kinds of grapes. "It depends on the choice of the grapes, on the care with which they are grown and tended, and on their subsequent manipulation and the storing of the wines, whether colonial wines will find permanent and increasing favor among wine drinkers. Recent improvements in South Australia have had such marked beneficial results that there is every hope of a successful future for these wines." During the interval of 16 years since those words were penned, South Australian growers have made great strides, and wines of splendid quality are produced in increasing quantities.

This fact has received striking confirmation from Mr. A. Browne, an expert from the neighboring State of Victoria. Mr. Browne acted as sole judge at the annual Wine Show held in August, 1903, and at the conclusion of his labors he said that—"In his experience as a judge he had never met wines so universally good and of such high standard. It showed that the growers, or those interested in the trade, thoroughly understood and appreciated their business when they put forward wines of such quality as they had done. It had generally been his experience in years past to be able to pick out four or five wines from the 10 or 20 samples in a class because they stood above the others; but in the present instance the exhibits all ran very close. They would see this when he furnished them with a copy of the points. It had been a very difficult and anxious matter to pick out the best wines. Their full red wines were good, honest wines, and approached the Burgundy. They were good export wines. They had got over the difficulty of producing wines. It was now a question of finding a market for them. He had never come across wines equal to the sweet wines he had judged. They could produce Tokay, Madeira, and Verdeilho, which would commend themselves anywhere. He had had an interesting conversation with Mr. Fueerhard, the Portuguese seller, who assured him they could produce as good a port wine as any in Oporto. He did not know they wanted anything better than the port wine he had judged." The "Lancet," the well-known medical journal, expressing an opinion on South Australian wines submitted in London, wrote:—"Australia at a moderate cost is sending us really good wines of the excellent type of those before us. Each year sees a marked improvement in the tone and quality of the vintage."

Concerning the profitable nature of the industry in this State, the case has been officially represented thus:—"If we admit that a well-cultivated vineyard will yield an average of two tons of grapes per acre, or about 250 gallons of wine, returning from 1/6 to 2/ a gallon at the cellar door, we have a gross return of from £19 to £25 per acre; and if from these figures we deduct the comparatively large sum of £10 per acre for cultivation, manures, cost of manufacture, interest on land and buildings, &c., we are left with a net profit varying from £9 to £15 per acre." "Can any other cultivated plant, grown on a fairly large scale," asks the Professor of Viticulture, "show figures to compare with these?" "Did our vineyard area," he has remarked, "extend over 100,000 acres, the land under vines would yield annually from two to two and a-half millions sterling, nearly one-half of which would be distributed amongst the community, the rest representing the profits of the growers."

Natural characteristics of soil and situation of our vineyards must needs always

Vintage at Auldana.

be a vital point of consideration if growers contemplate the production of high-classed wines. In South Australia, as in other countries, this potent fact is already making itself felt, and wines of the rarest types are met with in many cellars. The Minister of Agriculture, in a recent public utterance, said: "The possibilities of expansion in connection with the wine industry were very great. At present they had 21,000 acres, and the average production could be put down at 200 gallons per acre. At 1/3 per gallon that meant £12/10 an acre, or a gross return of £250,000. The cost of cultivation, the interest on plant, and the value of the land could be put down at £6/10 an acre, so that meant a profit of £6/10 on every acre cultivated. If they got 100,000 acres planted during the next 50 years their present output would increase fivefold. If they had 500,000 acres under cultivation it would give them £6,000,000 a year."

The growth of the wine industry has been remarkable considering the difficulties associated with the business. Some vignerons had a lot to forget in the cultivation of the vine in a new land. All of them had much to learn. The process of education was slow and costly, but most of the problems which troubled the early makers are problems no longer. Present day cellarmen have a clear course, and when a few difficulties connected with the marketing of the produce in foreign markets shall have been overcome, as they soon will be, the expansion of the industry will be assured. Early history connected with the introduction of the vine to South Australia was so well reviewed by the late Mr. Crompton at a banquet held at McLaren Vale a few years ago that I cannot do better than summarise the interesting statement made by him. It appears that Sir William McArthur, of New South Wales, to whom Australia was especially indebted for the introduction of the Merino sheep, also imported vines suitable for wine-making. That was the beginning of the well-known Camden vineyards. There was also a very valuable collection of vines made by Mr. Bushby which was subsequently entrusted to the Sydney Botanic Garden. There were Mataro, Grenache, and Carignan, and probably nearly all the vines of the South of France, and this collection was large in the number of varieties. Mr. Bushby spared no pains to make it complete. About Perpignan his tracks were to be found years afterwards. It was probably from Mr. Bushby's collection that South Australians obtained the varieties named, as well as the Shiraz. It was known in South Australia that those vines were to be had from Sydney, and cuttings were sent here before 1850, probably to various applicants, notably to Mr. Davenport at Macclesfield (now Sir Samuel Davenport). In addition to those importations to New South Wales, there were two collections of Spanish vines. From one of these originated the Clarendon Vineyard belonging to Mr. Leigh, after whom Leigh-street in Adelaide was named. The collection went to form a vineyard at Marino. In 1866 Mr. Crompton was introduced to the gentleman at St. Mary's, near Cadiz, who selected these cuttings for Mr. John Brown, a name well known to all old colonists, from whom they passed to Sir George Kingston. The introduction of the Zante currant vine is credited to Mr. Bailey, well known as giving his name to Bailey's Garden at Hackney. Various other vines were brought to the State at different times, as, for instance, the white Sauvignon, by Dr. Kelly, the Sultana vine, for raisin making, which was first grown at the Botanic Garden. To the late Mr. John Reynell, however, is due the credit of having imported cuttings of wine grapes from Sir W. McArthur, and of planting the first vineyard and making the first wine. Reynella did not exist as a township for some years afterwards, but there was a vintage there in 1846—probably the first in South Australia. Cuttings from Mr. Reynell were used in planting Dr. Kelly's vineyard at Trinity, Morphett Vale, and of Mr. Perry; also of some vineyards in the Tanunda district. The varieties planted in the first vineyard at Reynella were the Gouais and Verdeilho, white grapes, two kinds of Pineau, Malbec, and Carbenet grapes, red grapes. That was no mean collection as regarded quality, even judged with the experience of half a century. "It might interest my younger hearers," concluded Mr. Crompton, "to know when passing through the now large acreage of vines at Reynella, to recollect that it was the first vineyard

for winemaking in South Australia, and the parent of an industry from which much was now being realised, and from which much more might be confidently expected."

South Australian wines have gained a large number of prizes at foreign exhibitions and Interstate wine shows. In 1891, in Tasmania, the awards to South Australian makers were greater in number and value than the combined prizes which went to other States. The Colonial Surgeon, in one of his recent reports, stated: "Colonial wine still continues to be used (in the hospitals), and the experience verifies the remark made in previous reports that, while it costs less, it is superior to the imported article." South Australian wines and brandies are now in general use in the hospitals of Australia, and in many similar institutions in England.

The following table shows the quantity of wine made since 1861 in the years given:—

Year.	Gallons.
1861	182,087
1865	798,647
1870	895,795
1875	648,186
1880	500,955
1884	473,535
1890	1,052,086
1895	1,578,590
1900	1,558,285
1902	2,431,563
1903	2,573,424

The acreage under vines has steadily increased. In 1902 there were 12,314 acres, with 4,030,724 vines in bearing and 3,146,564 non-producing. In 1902 the area had increased to 20,860 acres, the number of productive vines to 9,504,880, and 1,396,531 vines not in bearing, aggregating over ten million vines. The increase in the area has been gradual over that period, as the following table will show:—

Year.	Acres.	In Bearing.	Not in Bearing.
1892 ...	12,314	4,030,724	3,146,564
1893 ...	15,418	4,206,880	4,545,737
1897 ...	18,333	6,809,737	2,493,928
1898 ...	18,761	8,021,070	1,803,367
1899 ...	19,159	8,814,086	1,355,014
1900 ...	19,438	9,032,083	1,310,948
1901 ...	20,158	9,207,935	1,215,908
1902 ...	20,860	9,504,880	1,396,531

The rapid increase in production during the last ten years has, notwithstanding a substantial advance in exports, compelled winemakers to extend their cellars and carry increasingly heavy stocks. Free-trade between the Australian States as the outcome of Federal Union has given an impetus to the Interstate wine trade, and South Australia has greatly benefited.

During the 12 months recently ended 60,517 gallons of bottled wine, valued at £22,665, was sent away, and 786,174 gallons in bulk, worth £102,251, against 40,826 gallons (£18,241) in bottle and 555,027 (£74,177) in bulk the year before. Victoria required more bottled wine and nearly treble the quantity of bulk, and mostly all the other Commonwealth States imported more than in 1901. The following table shows the wine in stock, the quantities exported, and the value thereof since 1892:—

Year.	Wine in Stock. Gallons	Wine Exported. Gallons	Value. £	Number of Stills.	Spirits Made.	Duty Paid
1892 ...	2,578,070	325,038	64,780	—	——	——
1893 ...	2,776,664	260,251	47,300	36	109,239	6,410
1894 ...	2,908,320	256,216	49,475	39	76,951	5,832
1895 ...	3,579,605	343,405	58,826	36	98,718	7,096
1896 ...	3,713,381	391,233	73,316	38	147,093	9,779
1897 ...	4,371,951	513,714	82,553	38	128,376	12,628
1898 ...	3,717,008	514,065	78,381	37	149,488	11,346
1899 ...	3,896,307	496,610	77,773	38	94,045	11,195
1900 ...	3,521,637	476,646	78,153	40	123,302	12,930
1901 ...	4,915,636	595,853	92,418	57	122,214	13,807
1902 ...	5,027,759	846,691	124,916	63	172,728	15,897
1903 ...	5,535,694	——	——	—	——	——

The official agricultural report of the State for 1901-2 states:—"It is evident that the future of the vine industry must depend more and more on extraneous demand, especially from consumers in Great Britain. The consumption of Australian wine in the United Kingdom was in 1860 only 951 gallons; in 1870, 36,147 gallons; in 1880, 55,000 gallons; in 1890, 314,401 gallons; and at the close of the century, 822,503 gallons. During the 40 years the total consumption in the United Kingdom of wine of all countries increased from 7,358,192 gallons to 15,888,069 gallons. The world's production of wine is 3,618 million gallons, of which 1,482 millions are produced in France." In this connection the following extract from a recent issue of "The Times" is suggestive:—"The Board of Trade returns for the last few years show a tendency to substitute Australian for French wines. In 1887 the total importation of colonial wines was only 168,188 gallons. The subjoined tables indicate the rate at which the public taste is altering:—

IMPORTS OF AUSTRALIAN WINES.

Year.	Gallons.
1890	314,401
1895	607,064
1900	823,503
1902	992,844

IMPORTS OF FRENCH WINES.

1896	6,736,718
1900	5,382,704
1902	5,260,658

It will be observed that there is a steady increase in the imports of Australian wines, with a corresponding fall in the imports of French wines. Of course, the imports of Australian wine, as compared with the whole quantity of wine brought into the country, are a mere drop in the bucket, so to speak, but the strong tendency to change is manifest. The total quantity of wine imported into the United Kingdom, and its value for the last three years, were as follows:—

	Amount. Gallons.	Value.
1900	16,803,829	£5,192,909
1901	16,546,206	4,931,335
1902	16,456,663	4,947,767

The value of the Australian wines imported in the same years was:—1900, £146,348; 1901, £122,084; 1902, £157,298, so that the increase in value corresponds with the increase in quantity shown in a preceding table. Australia is admirably fitted to grow large quantities of excellent, wholesome wine. The growers in that country have gone to great expense, and have manifested much enterprise in obtaining the best varieties of grapes, and the most improved plant and appliances, for producing wine of a high quality. They have also induced French experts to emigrate to Australia to teach the best methods of dealing with the vine, the grape, and the wine, at every stage, from the planting to the bottling of the finished product. One point, which every one connected with the Australian wine trade is insistent upon is that the wine consists of the pure juice of the grape without any admixture or 'faking,' such as have recently been shown to take place in connection with some Continental wines."

The pioneer vigneron in South Australia employed the same primitive methods of extracting the juice from the grape as those followed by the Egyptians in the days of the Pharaohs. All kinds of "presses' were requisitioned in the "early days" from the naked feet of young Australians to the home-made hand crusher. South Australian vignerons have had to pass through a long and trying course of evolution before they reached the position which at this moment marks them as ranking amongst the most enlightened wine makers of the day. Few countries have been so alert to the requirements which different climatic conditions have brought along with them. Not only are our wineries models of cleanliness and perfect fermenting houses in every sense of the word, fitted up as they are with the most approved cooling systems, but they have been almost universally built to take advantage of the slope of the land which enables the pulp or wine to gravitate from the top end of the cellars to the terraces lower down the hill. South Australians may pride themselves with having originated and perfected a scheme for treating enormous bulks of grapes, which is not only being copied by the other wine-growing States of the Commonwealth, but has attracted the attention of interested visitors from many of the largest wine growing

centres of the world. Viscount des Garets, after a visit to one of these establishments, expressed himself in terms of the highest encomiums at the practical principles which have been introduced to minimise the handling of the grapes when they have once passed the stemmers and crushing mills. New machines of the latest patterns are continually taking the place of older types, and powerful hydraulic and continuous presses are used for treating the "marc" at the final stage. Spontaneous fermentation, which is still almost entirely relied on in old and conservative countries is fast being replaced by more scientific methods. Cultivated levures are introduced into the "must," and, although it cannot be claimed that a superior wine may be produced from an inferior grape, it has nevertheless been proved that when a ferment of energetic qualities has gained the upper hand it suppresses the numerous undesirable germs which would otherwise develop to the detriment of the fermented product. Every country that desires to attract the permanent attention of those interested in the industry must necessarily produce larger quantities of a uniform class of wine whose quality may be thoroughly relied upon. Our vignerons recognise all this, and they know that it is useless for Australia to endeavor to create a market for herself by imitating the thin, almost unsaleable wines of France or the more acrid types of the Rhennish districts while her generous climate is so favorable for the production of so rich and full-bodied a wine which is already gaining the serious consideration of the English merchants.

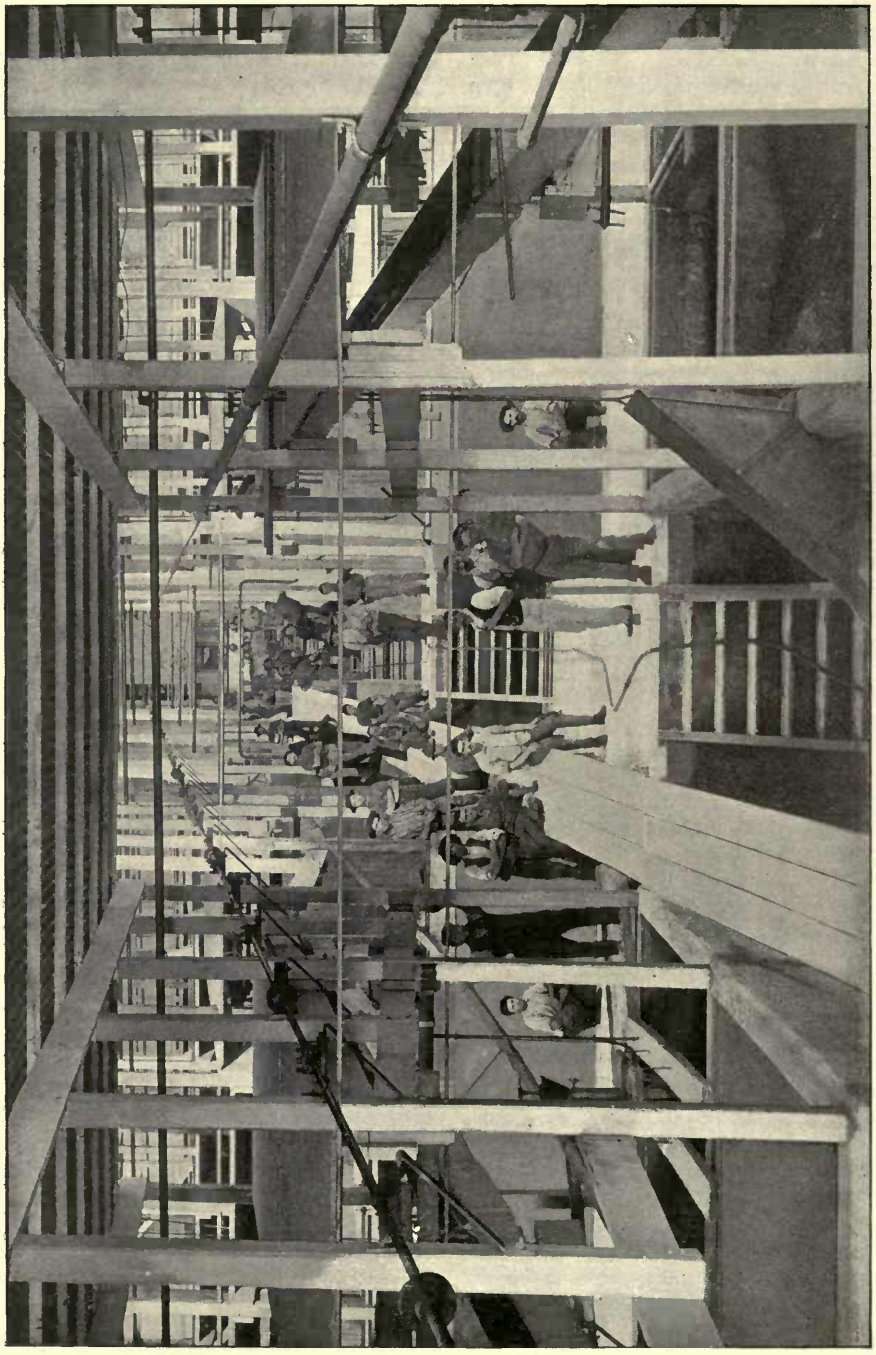
There are two features in connection with the wine industry to which vignerons attach great importance. One is the entire absence of disease in any of the vineyards, and the other is that with the removal of the border custom house on the establishment of Federation a large Interstate market was at once thrown open. A few years ago a Phylloxera Board was established under Act of Parliament, and complete machinery was created for preventing the introduction of the pest so much dreaded by the vinegrower. Mr. Henry Lowcay, an expert of considerable experience in other countries, was appointed Inspector under the Board, and he has made two complete inspections of every vineyard in South Australia, over two years having been occupied in this critical examination. Mr. Lowcay, in his official report, has been able to declare that not only is there not the slightest trace of phylloxera in South Australia, but that the vineyards are completely free from disease of any kind.

The importance of the Interstate markets to which South Australian wines now have free access may be gathered from the following comparative figures showing exports of wine to various States:—

	1892.		1902.	
South Australia to—	Bottle. Gall.	Bulk. Gall.	Bottle. Gall.	Bulk. Gall.
Victoria	1,365	3,406	6,209	21,721
New South Wales	2,592	3,827	14,988	51,939
Western Australia	3,321	3,382	10,190	8,851
Queensland	5,221	1,448	11,577	17,696
Tasmania	104	2,222	1,340	8,038
Northern Territory	817	119	2,198	539
Total	13,420	14,404	36,512	108,784
Total exports to all countries	21,243	303,795	60,517	786,174

The Brandy Industry.

One of the most remarkable features in connection with the wine industry has been the increase in the production of brandy. In 1892 the quantity of locally-distilled spirit was 109,239 gallons; 1902. 172,728 gallons were made. The superior quality of the brandy produced here from the pure juice of the grape has secured the approval of the medical faculty at home and abroad. Considerable capital has been invested in the industry, and the latest appliances brought into use. The



Interior of Winery, Seppeltsfield, South Australia.

total quantity of spirits distilled during the ten years has been 1,222,154 gallons, upon which £106,920 duty was paid. The quantity locally distilled last year was 172,728 gallons, upon which £15,897 duty was collected. Whilst locally-distilled spirits increased 58 per cent., those imported decreased 88 per cent., the latter showing 127,954 gallons last year, against 240,567 gallons ten years ago. The quantity of brandy warehoused has been as follows:—1895, 18,945 gallons; 1897, 46,468; 1901, 38,108; and 1902, 17,646 gallons. The duty on spirits, formerly 15/, is, under the Commonwealth, 14/ per gallon. The excise charge on locally-distilled spirits was 9/4; it is now 11/ per proof gallon. For fortifying wine, produce of the State, 1/ is charged instead of 6d. per proof gallon, as heretofore.

The Viticultural Expert of Western Australia (Mr. Despeissis, M.R.A.C.), in his official handbook referring to Australian brandy, says:—"Three or four of the leading brandy manufacturing firms of the Eastern States have lifted it up, in the face of unreasonable prejudice, to the level of the best brands of French brandy. The trade is a rapidly increasing and profitable one, and the Army Commissariat, recognising its merits, now puts it on a par on its tender list with the best brands of French Cognac placed on the market."

The distilling of brandy is in so many ways closely allied to the wine industry that it is almost essential that the two should be taken together. Whatever advancement has been made in the latter branch has also had the effect of improving the quality of the former. There is no doubt that spirit-drinking is as much susceptible to the fashion of the day as the consumption of any other liquor, and it cannot be denied that the tendency in Australia to-day is towards the consumption of distillations of the malted liquors. There is a steady increase in the production of pure Australian brandies which are only able to create a demand for themselves at the expense of the imported French article. It is not unlikely that the purity of the spirit has greatly assisted to open up this branch of the industry, and if its high standard and quality are maintained, there is no doubt that it will in time completely drive the imported article from its shores. It has frequently been demonstrated by statistics that the consumption of French brandies is far greater than the production of pure grape spirit in France. From this it will readily be seen that a wholesale adulteration must be practised on the Continent, and it can easily be concluded that Australia has also been long the dumping ground of much of this doubtful production. It is hard to legislate in order to prevent an abuse of this kind, all the more since it is almost impossible to distinguish by analytical methods between pure grape spirit and spirit derived from other sources. The Federal Government have wisely taken the precaution that all labels used for bottling Australian brandies in bond must first be approved of by responsible officials, and this has left no opening for doubt that they are anything else but the product of the pure juice of the grape. On the other hand, it seems surprising that the foreign article, labelled so as to deceive the public, should be permitted to enter our ports without any further question. Another glaring instance of the one-sidedness of the law is that Australian wines are only permitted to be fortified with pure grape spirit, whereas it is a well-known fact that the imported wines are never fortified with any other spirit but that which is foreign to the grape. The distinctive character and flavor which distinguishes a pure grape brandy from any other spirit is due to the presence of delicate æthers and essential oils which are passed over with the spirit during the process of distillation. Brandies of the highest qualities are usually distilled on the old pot-still principle, but care has to be exercised to divide the distillate in such a manner that only the higher grade spirits are retained for consumption. As the young spirit passes from the still, it is conveyed into the bonded warehouses, where, under the supervision of the Government official, it is allowed to mature until during the course of time the fragrance of the œnanthic and other æthers is developed and the spirit itself becomes mellow. So highly are Australian brandies esteemed for their purity that they are used in almost every hospital throughout the Commonwealth and medical men are loud in

their praises as to the stimulating qualities of this spirit. Distilleries began to spring up during the earliest period of the settlement of South Australia, and no doubt many a quiet out-of-the-way place that was not within the direct knowledge of the suspecting excise man drove a thriving trade by avoiding the Customs duties. It is only natural that much crude spirit in this manner found its way into consumption, for the doubtful method under which distillation was conducted, combined with a ready sale, rarely ever permitted the spirit so produced to be aged until its coarser properties were reduced. The introduction of stricter laws, a more settled manner of life, and a refinement of the palate of the drinking public, however, altered this lax state of affairs. The production also grew larger than the consumption, and thus the demand for aged brandies soon forced the distillers to adopt more rational methods for carrying on this important industry. Apart from such spirit that is consumed as brandy pure and simple, there are thousands of gallons that are annually used in the manufacture of sweet wines such as ports and sherries. This has necessitated the erection of large distilleries which are fitted up with the usual elaborate and complicated plant for the distillation of high-grade rectified spirit. Each distiller favors such methods as he thinks most applicable to his own particular case, and, although stills of every description have been introduced from England as well as the Continent, the principle on which they are all based relies on the fact of different degrees of Caloric being requisite to convert different liquids into vapor. Such, then, is the development that has taken place during the course of time, and, although it is more often considered but a branch of the wine industry itself, it is nevertheless of sufficient importance as to be a great source of revenue to the State.

A View near Tanunda, one of the largest wine-producing centres in the State.
S. J. Dailey photo.

The Land Laws.

In the Imperial Act establishing South Australia as a British province the price of land was originally fixed at £1 per acre. Owing to the difficulty experienced in raising the prescribed sum of £35,000 from the sale of lands—£20,000 of which was to be invested in Government securities in order that the mother country should bear no financial risk in the founding of the new province—the minimum was subsequently reduced to 12/ per acre. Under the modified scheme 437 lots of land, comprising a total of 58,995 acres, were granted under preliminary land orders, which also entitled the holder to a town acre, and these realised £35,397. There were also sold at the same price twenty town lots of eighty acres each, bringing the total territorial revenue up to £36,357. The minimum price of land in South Australia was thereupon raised to £1 per acre. Regulations made at the time provided that every applicant for land, in order to entitle himself to a grant, should pay a certain sum into a fund to be employed in bringing out laborers. Persons paying cash for 4,000 acres had the right to call for the survey of any compact district not exceeding in extent 16,000 acres. Under these provisions, up to December 22nd, 1837, in addition to the area already stated, 3,300 acres of country lands at £1 per acre, and 563 town acre lots for £3,594, had been alienated. In 1838 48,000, and in 1839 170,841 acres were disposed of, making a total of sales effected and amount realised up to January 1, 1840, 283,507 acres for £262,240. Land continued to be dealt with under the original regulations until 1843, when the first local Act was passed. The land laws have undergone frequent alterations since then, and a large volume would be required to review the process of evolution necessary to meet the changing requirements. The initial mistake was in seeking to transplant English methods of land tenure to a new country where the conditions were so dissimilar. Much mischief has also resulted from the attempt to apply the same laws to lands varying in quality and subject to different climates. The difficulties of colonization were indefinitely multiplied by these and other legislative and administrative errors. It was only after years of bitter experience and fluctuating fortunes that the vast territory which forms the State of South Australia came to be better understood. The flockmaster pushed his way back from the seaboard, testing the climate and the productive capacity of the soil as he went. The farmer followed with his plough, never heeding the warnings uttered by the squatter or such an authority as the late Mr. Goyder, for many years Surveyor-General. This officer personally surveyed and inspected large areas, and, being a man of keen observation, he noted the suddenness with which the country changed from large trees and rich grasses to stunted scrub and bare hills or vast plains of salt bush, blue bush, cotton bush, and other herbage. He fixed what has since been known as Goyder's line of rainfall, a theoretical division which has proved to be singularly correct. The ancient theory, however, that "rain follows the plough" was firmly believed, and the agriculturist set his face northwards with a determination which was admirable. For some time land legislation was dictated by popular clamor for broad acres.

The upset price of country lands was fixed at £1 an acre, and as the financial wants of the province increased every effort was made to push on with the sale of land in order to bring in revenue. It was shortly after the first flush of excitement over the Victorian goldfields had subsided and the stream of population had begun to flow towards South Australia that settlement began to increase. In the year 1853, 213,221 acres were sold for £291,660, and from that time onwards the acreage under cultivation rapidly expanded. In 1854 it stood at 129,692 acres. Five years later the cultivated area had increased to 361,884 acres, and in 1865 it was 660,569 acres. When power was granted to the local Legislature to pass land laws an at-

tempt was at once made to encourage occupation. In 1869 an Act was passed providing for free selection after survey in declared areas, the selector being allowed a certain number of years in which to pay his purchase money. He was compelled in the meantime to pay interest at a moderate rate and to comply with conditions of residence and improvement. Reforms followed in quick succession, so rapid indeed that the land legislation of the country was confusing even to those whose duty it was to administer the laws. Every new Parliament made an attempt to improve on the land laws, and whole Acts were bodily repealed, or special clauses were amended and patchwork legislation was resorted to. The chaotic condition of the land laws, after so much tinkering, made a consolidating measure imperative, and in 1878 the Crown Lands Consolidation Act came into operation. The area alienated from the Crown in fee simple, including completed purchases, at that time totalled 4,970,940 acres, realising £6,362,059, and the area held on credit after deducting revoked and abandoned selections and completed purchases was 2,509,606 acres, on which the sum of £3,534,576 was agreed to be paid. The population then stood at 236,000, and the area under cultivation at 1,828,000 acres, giving an average area of about 31 acres sold or selected land for each person, of which area $7\frac{3}{4}$ acres were under cultivation. Crown lands continued to be alienated for some years until a resolution was carried in Parliament stopping the sale of public lands and adopting exclusively a system of leasing. This method has since been partially abandoned. Up to the latest date available, the transactions in land since the foundation of South Australia have been as follows:—

	Area in Acres.	Amount Received.
Area sold in fee simple ...	7,664,787	9,690,551
Area granted University, &c.	121,705	—
Dedicated to Renmark Settlement	16,652	—
Dedicated to Conservator of Forests	189,844	—
Agreement to Purchase ...	4,370	172
Credit Selections	234,809	230,204
Scrub Leases (instalment paying)	115,485	19.579
Total alienated, &c.	8,347,652	9,940,506

Leased Lands—	Area in Acres.	Annual Rental.
Right of Purchase Leases ...	5,556,311	32,208
Perpetual Leases	8,374,022	41,066
Miscellaneous Leases ...	2,206,961	10,935
Selectors' Leases	135,580	1,425
Grazing and Cultivation Leases	535,344	1,462
Reserve Lands, S.E. District	51 643	302
Aboriginal Leases and Licences	24,094	13
Pastoral Lands	74 917,305	31,383
Total leased ...	91,801,260	£118,794

Area Surveyed—	Acres.
Open to Allotment, Ordinary Lands ...	2,752,311
" " Pastoral Lands ..	16,755,200
" " Miscellaneous ...	662,989

LANDS REPURCHASED FOR CLOSER SETTLEMENT AND HOMESTEAD BLOCKS.

156,481 acres. Original purchase money, £197,389. Repurchased at £306,800.

	Area in Acres.	Amount Received.
Sold for Cash	540	3,794
Agreements to Purchase	59,603	On Land 2,531; Imprvmts. 1,491
Total alienated, &c.	60,143	7,816

		Annual Rental.
Right of Purchase Leases (Homestead)... ...	2,541	576
Perpetual Leases ...	91,877	8,276
Miscellaneous Leases ...	274	49
Total leased, &c. ..	94,692	£8,901

Grand total of "Closer Settlement" lands in occupation, 154,835 acres.

During the last session (1902) of Parliament a further Crown Lands Consolidation Act was placed upon the Statute Book. This measure provides for Crown lands being let on perpetual lease without revaluation, or disposed of under agreement with covenant to purchase by sixty half-yearly payments of the purchase money, including interest at not less than two per cent. or more than four per cent. per annum. The purchasers have the right to complete purchase of their holdings after having held the land for six years. In order to meet the growing demand for land, estates are now repurchased by the Government and disposed of under agreement with covenant to purchase, under similar conditions to the covenants under which Crown lands are disposed of, except that the interest charged must not be less than 4 per cent. About 154,000 acres have already been repurchased and dis-

posed of to desirable tenants, most of whom appear to be doing very well on their holdings. During last session Parliament authorised the Pinnaroo Railway Bill. This line, which will start from a point—Tailem Bend—on the Adelaide to Melbourne track, goes in an easterly direction towards the Victorian border. It is expected that about half a million acres of land on either side of this railway will be available for purchase, and will almost all be taken up within the next two or three years. The purchase money will be payable in sixty half-yearly instalments with interest at 2 per cent. per annum, the purchaser having the right to pay off the whole of the purchase money at any time during the currency of his agreement. It is estimated that the work will have the effect of opening up about 1,500,000 million acres of good agricultural country during the course of the next few years.

In no direction have greater changes been made in the land laws than in the treatment of pastoral country outside of hundreds. A pastoral lease is now practically identical with a perpetual lease. The country can only be resumed when it can be shown that it is required for purposes of "intense culture" or "closer settlement." Pastoral country likely to be required for closer settlement may be leased for 21 years; all other pastoral lands may be let for 42 years, subject to revaluation of the rent for the last 21 years. In each case the Pastoral Board fixes the rent, having regard to the carrying capacity of the land for depasturing the stock, the value of land for agricultural or other purposes, the proximity and facilities of approach to railway stations, ports, rivers, or markets, and any other circumstances affecting the value of the land to a lessee. In revaluing the rent for the second period of 21 years, the amount fixed shall not be more than 50 per cent. higher or lower than the rent payable for the first period of 21 years. The lessees are required to pay the value of the improvements as fixed by the Pastoral Board in 21 or 42 annual instalments (according to the term of the lease), principal, and interest at 4 per cent. per annum. The lands are advertised open to a given date, and all applications received up to that time are considered by the Board, which allots the leases to the most desirable applicants. All such allotments must be approved by the Commissioner of Crown Lands. In the event of resumption for any purpose, the lessees are entitled to be paid the value of the improvements effected by them, as well as compensation for loss occasioned by resumption. If the land is required for any public purpose, one month's notice of intention to resume is necessary. If for intense culture one year's notice of intended resumption is required. The lessees are entitled to receive payment for improvements from the incoming tenant if the lands are let to other tenants at the expiration of the term of the lease.

The land laws of the State are on a liberal basis, and elasticity and sympathy characterise their administration. There is a genuine desire to encourage settlement, and in no other State in the Commonwealth is the outlook brighter for the producer possessed of brains and moderate capital.

Mining.

South Australia's mineral potentialities are immense, but with the exception of copper the amount of wealth which has been won from beneath the surface of the earth does not compare favorably with that derived from other sources. The production of minerals does not fairly represent the amount of labor which has been expended in this direction, or the possibilities which await the prospector and the miner. During 1901 the value of the total productions of the State were valued at £10,314,000, of which mining was responsible for only £614,000. Copper accounted for no less than £500,037. So far from these figures affording any ground for pessimism regarding the establishment on a broad basis of a mining industry they should stimulate further prospecting and encourage judicious investment of capital. An official report issued in 1859 contained the following reference:—"The large extent of mineral country and the valuable deposits of rich copper ore, &c., lately discovered give promise of future wealth to South Australia, the magnitude of which can scarcely be estimated." One of the earliest arrivals at Kangaroo Island was an experienced German geologist and mineralogist—Professor Menge. In 1837 he removed to the mainland and quickly earned for himself the title of "Father of Mineralogy." Mr. Menge soon came to the conclusion that copper and gold abounded—"the hills are full of them." To him belongs the distinction of having demonstrated that precious stones existed in South Australia, and during his residence he is said to have discovered the following:—Amethyst, aquamarine, beryl, chalcedony, chrysolite, chrysoprase, cornelian, diamond, emerald, garnet, jasper, mocha-stone, opal, smargaldine, tourmaline, and topaz. Specimens of these were sent to the Great Exhibition of 1851, and attracted considerable attention. The first indication of the existence of silver-lead ore was made in 1838 on a section of land belonging to Mr. Osmond Gilles, after whom Glen Osmond, at the foot of the Adelaide hills, was named. No attempt was made at the time to follow up the discovery. Three years later, however, the South Australian Mining Association was formed to work the Wheal Gawler Silver and Lead mine near Glen Osmond. A few tons of the ore were sent to England in the Cygnet, and an assay made in the State resulted in 12 oz. of silver to the ton, and 75 per cent. of lead. By the end of 1850 there were 49 reputed mines at work, of which 39 were copper shows. Since those days a diligent search for minerals has been prosecuted, and almost all descriptions have been found in various parts of South Australia. In the south and mid-north gold, silver, lead, asbestos, silver, manganese, antimony, nickel, iron, zinc, cobalt, bismuth, native sulphur, and gypsum, in addition to others, have been located. From the far northern part of the State to the Northern Territory precious stones have been found. Of the products which come out of the earth, South Australia has valuable salt deposits, as well as superior marble and slate. Mineral oil is said to exist in several places, but so far the assertions of experts have not been proved. Coal has been struck 370 miles north of Adelaide. It is to copper that South Australia is chiefly indebted for the development of the mineral industry. The bronze metal was first brought to light early in the forties, and about the same time the existence of gold became known. The manner in which the first copper mines were discovered would form material for the novelist. The lonely boundary rider, the shepherd intent on finding the best pasture for his flock, the roving prospector literally stumbled across stores of treasure which have yielded enormous wealth to individuals and the State.

The export of ores began in 1842-3, when the records show that £100 worth was shipped away. By 1855 exports of mineral produce reached a value of £155,557, while four years later they had

swollen to £411,018. During the five years (1850-1854) copper, &c., constituted no less than 40 per cent. of the exports of produce, against 25 per cent. for wool, and 27 per cent. for breadstuffs. A very rapid increase took place during the next few years, and in 1864 official statistics reveal that £691,624 represented the value of the mineral industry of the State. In that year the output was four-fold greater than in 1855, while for the ten-year period (1855-1864) exports reached £4,500,000. To date the value of ores and metals sent out of the State has exceeded twenty-five millions sterling. A ten-year comparison of exports, which is the only trustworthy basis for gauging the growth and importance of the mineral industry is as follows:—

1842	nil.
1852	£374,778
1862	547,619
1872	806,364
1882	462,270
1892	204,418
1902	498,325

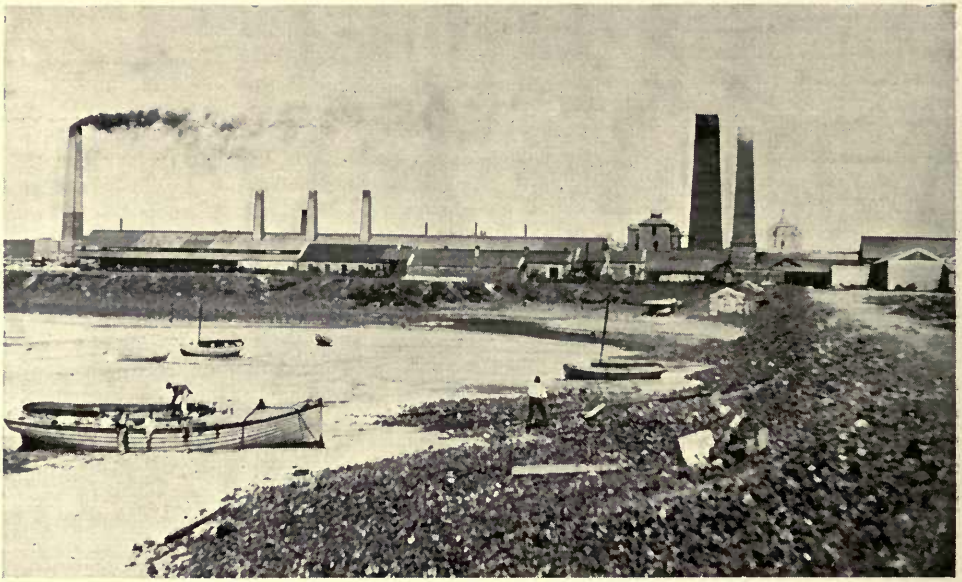
The export of minerals reached high-water level in 1866, when the recorded value was £824,501. It should be borne in mind, however, that in the sixties and early seventies the production of copper was large and prices were high. It is officially estimated that the number of men at present employed in mining pursuits in South Australia is about 6,000, as follows:—Copper, 4,000; gold, 1,000; salt, 300; silver-lead, 150; coal, 50; other minerals, 550. These figures include employees of smelting works.

Copper.

Outside of copper comparatively little has been done in mining in South Australia for years, but in this department of industry the record is one of which any country could be proud. The first discovery was made in 1842 by Messrs. F. S. Dutton and C. S. Bagot, at Kapunda, about 50 miles north-east of Adelaide. Operations were started in the following year, and from the outset they proved profitable. There were many obstacles to be overcome in those early days, but the pioneers of the State were men not to be daunted. All the material raised had to be carted to Adelaide by road, while bullock drays had to be requisitioned for the conveyance of stores to the field. The first ore was raised on January 8, 1844, and on the 23rd of the same month a small parcel was sent away. Four lodes were revealed varying from 4 feet to 6 inches in width, the proportion of metal to the ton running about 18½ per cent. In 1879 the mine was sold under liquidation, having yielded 70,000 tons of ore. For a number of years afterwards the property was worked by tributors, but of recent years operations were suspended owing to a large influx of water. The opinion is held in some quarters that the Kapunda mines should still be regarded as one of South Australia's valuable assets. This year a company was formed to treat the tailings which were left on the surface when work was suspended. A magnetic extraction plant has been erected, and work has been started.

Situated about 100 miles north of the city is the celebrated Burra Burra mine, which earned a world-wide reputation. Discovered a couple of years after the Kapunda show, the Burra Burra property, in its palmy days, paid in dividends £800,000, and as the capital invested was only £12,320, it will be seen that the fortunate shareholders were richly rewarded. For many years the average yield was from 10,000 to 13,000 tons of ore, averaging from 22 to 23 per cent. of copper. It is stated that in the 29 years of active working £2,240,000 was disbursed in general expenses, and equal to 51,622 tons of copper was secured, which, at the average price of the metal at that time, yielded close on £4,750,000. In 1859 there were 1,170 men employed. Work was suspended in 1877 owing to the low price of copper, and also because the deposit of rich metal seemed to have become exhausted. Subsequent boring with the diamond drill, however, pointed to the continuance downwards of the copper-bearing ground.

A mine still richer even that either the Kapunda or the Burra Burra was accidentally discovered in 1860 on Yorke's Peninsula. This was the famous Wallaroo mine. For the first five years the average output was under 8,000 tons, but it increased rapidly, and by 1869 had



View of the Smelters at Wallaroo.

reached 26,000 tons per annum. So great was the interest aroused by this discovery that in a few months claims were lodged for the lease of no less than 136 sections of supposed mineral land in the vicinity. There are five lodes on the property varying from a few inches to twelve or fourteen feet in width. The drives, levels, &c., extend for a distance of 20 miles, and the present yield ranges from half a ton to six tons per fathom. In 1861 a still more valauble discovery was made by a shepherd a little to the south-west of the Wallaroo. This was the celebrated Moonta mine, which from the first proved so rich that within twenty months 80,000 tons of ore were recovered, and £64,000 distributed in dividends. There are five main lodes, but numerous spurs and cross veins bring the total to twenty-seven. The mine has no fewer than 77 shafts, and the levels measure 29 miles. At one time employment was given to 1,600 men. The Moonta and Wallaroo mines were amalgamated in 1890, and together they have continued to constitute a rich source of wealth to the State. This district has put £12,000,000 into circulation, and has for forty years employed between 2,000 and 3,000 persons, and indirectly supported many more. Since the amalgamation of the two companies, £1,780,000 has been paid in wages, irrespective of £420,000, for which the smelting works in connection with the mines have been responsible. Recent borings have been of an encouraging nature, and, quite apart from the reserves of wealth which the company has come upon, it is worth mentioning that an adjoining property—the Yelta—has been taken up and worked by another company.

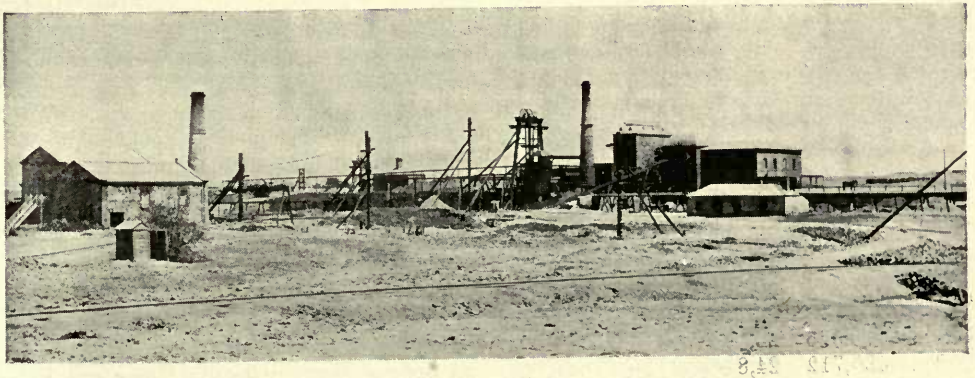
The following notes, furnished by Mr. H. R. Hancock, late manager of the Wallaroo and Moonta mines to accompany specimens which were exhibited at the Jubilee Exhibition in 1887, will give some idea of the geological occurrence of copper at these famous mines:—"Moonta—Near the surface recent limestone and clay deposits are found, but the bed rock in which the lodes occur is a felsite porphyry of a very hard and compact nature. The secondary series of rocks are entirely absent. The richer ores are met with only at comparatively shallow depths, with the exception of bornite—rich purple sulphide—which is occasionally found at the deepest parts of the mines yet explored. The bulk of the produce obtained consists of chalcopyrite, a large proportion of which is found in connection with quartz.

or other gangue, and which is extracted and brought up to an average of 20 per cent. of copper by means of crushing and jigging machinery." Wallaroo—The formation below the alluvial soil is composed of recent limestone and clay, underneath which the bed rock, a non-fossiliferous talcose schist is met with. The lodes exist in the older formation, and are sometimes discovered by costeening to the depth of the recent overlying deposits. The ores near the cap of the lode are generally of the oxidised class, and they pass generally into the chalcopyrite as greater depths are attained. The lodes project above the bed rock into the calcareous deposits, but do not form an outcrop above the surface of the ground.

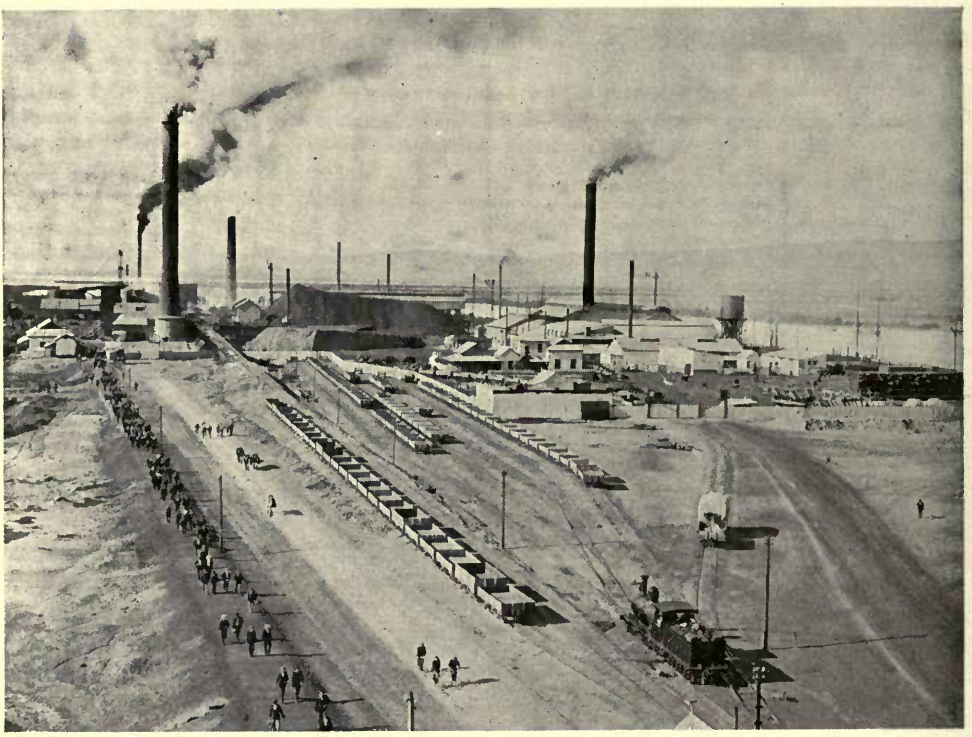
Another property capable of good things, in enterprising hands, is the Blinman, situated in the Flinders Range, 270 miles north of Adelaide, at an elevation of 2,000 feet above the Parachilna Plains. Its fortunes have been somewhat varied since 1862, owing in large measure to drought; but the Government Inspector of Mines says, in a recent report, that the ordinary ore raised to-day averages 8 per cent., and is dressed up to 23 per cent., whilst the ore from the cross-courses and leaders, which can readily be separated by hand-picking, averages from 30 to 40 per cent. of copper. The same gentleman states that there is no falling off in the yield as the mine grows deeper; and he is further of the opinion "that the strata will continue to be ore-bearing to a great depth, and that the mine is, to all intent and purposes, a permanent one." The water difficulty, which militated against operations in the past, has now been largely overcome, and the capacity at the present time is estimated at 150 tons of 23 per cent. copper per month, in addition to 50 tons of 28 per cent. carbonates. This property has been recently acquired by the Tasmanian Copper Company, and mining is being resumed.

The Hamley, which forms one of the Moonta group, is another of the mines producing copper at the present day. Nine shafts have been sunk the deepest of which is 175 fathoms. There are six lodes, varying in width from 1 foot to 6 feet. Close on £60,000 has been distributed in dividends. A number of other smaller shows add to the annual production of copper, while many are on the verge of productiveness, and with a rise in price of the metal, or with conditions making it possible for plant to be erected which would save a larger proportion of copper, many other would again be worked. The total number of mines being operated and giving employment to more than twelve men is nineteen. The following table shows the most important producing copper mines of South Australia:

	Men Employed.	Annual Copper Production. Tons.
Wallaroo and Moonta	2,100	5,500
Beltana	50	In course of development.
Prince Alfred	12	50
Lynda	16	50
Hamley	60	150
Paramatta	200	60



Moonta Mines.



A View of the Smelting and Refinery Works, Port Pirie.

Other Minerals.

As previously remarked, not much has been done in mining in South Australia apart from copper. The following table showing the annual production in ten year periods will illustrate this:

	Copper. £	Gold. £	Silver and Silver-Lead. £	Total. £
1843...	23	—	104	127
1844...	4,009	—	2,427	6,436
1845...	10,874	—	871	13,484
1846...	140,794	—	1,457	142,251
1847...	171,883	—	2,307	174,190
1848...	310,387	—	10,556	320,943
1849...	216,619	—	2,906	219,547
1850...	353,890	—	3,334	305,464
1851...	297,854	—	1,592	310,516
1852...	362,148	—	—	374,778
1862...	524,854	—	3,247	547,619
1872...	702,734	—	2,324	806,226
1882...	455,570	3,080	2,111	461,425
1892...	175,525	26,097	855	204,051
1902...	430,712	24,828	22,303	498,325

To date the detailed return of minerals exported from the State is as follows: Copper, 4,541,957 cwt., £16,798,789; copper ore, 683,441 tons, £6,421,385; lead, 101,968 cwt., £92,435; lead ore, 10,711 tons, £169,089; regulus, 3,516 tons, £125,545; bismuth ore and bismuth, 1,402 cwt., £16,679; manganese, 13,362 tons, £46,421; gold, 138,574 oz., £528,881; silver, 4,629 oz., £862; tin, 697 cwt., £605; spelter, 12,888 cwt., £12,081. It is only fair to state that the exact quantity of certain minerals won from the earth in South Australia cannot easily be ascertained. This is particularly the case with gold, considerable quantities of which are sent to the Melbourne Mint or are purchased by the Banks without ever showing in the official returns. Smelting works for the treatment of ores were erected about the fifties, the E. & A. Copper Co. smelting first at Burra and later at Port Adelaide. Works were established at other centres also, but at present operations are being conducted

only at Wallaroo by the Wallaroo and Moonta Co. Consequently about the fifties exports of copper ore began to show a decrease, and of copper metal a corresponding increase. During the five years 1855/59, compared with the preceding quinquennial period, the increase in the average shipments of copper was 30 per cent. compared with a gain of only 10 per cent. of ore. The export of copper was not commenced till 1848, but in three years it reached a total of £174,574, and by 1862 was over £400,000.

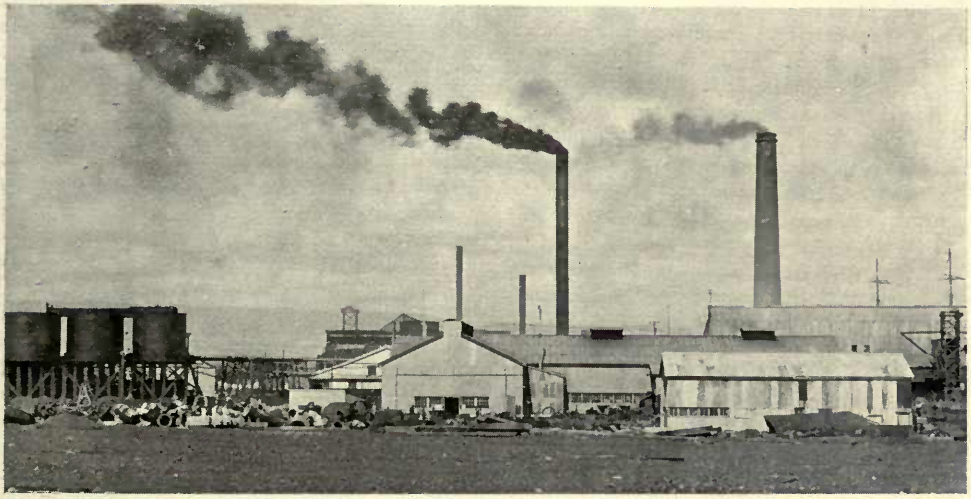
The remarks regarding the wide distribution of copper apply in an even greater degree to the gold, though it unfortunately cannot be said that the gold mines have come within measurable distance of the copper mines as regards the value of the yield. The precious metal was unearthed as early as copper, the Victoria Mine, about ten miles from Adelaide, being opened in 1846. The major portion of the gold-bearing country to the south of Adelaide is on land which was alienated from the Crown in the early days, and consequently no returns are available. Alluvial gold has been worked for many years in the numerous gullies in the Adelaide hills. Amongst other localities in the northern areas, Teetulpa may perhaps be considered the most important alluvial field, it being estimated that over £300,000 worth of gold was quickly obtained there. Valuable reefing fields have been discovered in the Echunga district, at Mount Grainger, Barossa, Wadnaminga, Mannahill, Nillinghoo, and other localities, and it is generally agreed that these reefs have not been developed as their undoubted richness warrants. The Echunga diggings became known early in 1852. Prospectors came across some very rich surface shows, and even down to the present day small bodies of men have made a good living as the result of mining operations at this part. No "mines" have, however, been developed. It is estimated that at least some 300 reputed gold mines have at various times been started, but most of them have been abandoned. A year or two ago gold was discovered at Tarcoola, situated about 360 miles north-westerly from Adelaide, and 170 miles from the Coward Springs Railway Station. This field, from the promising, and in many cases exceedingly rich discoveries already made, appeared destined to become the richest goldfield worked in South Australia. Much interest was aroused in the field. Steps were taken to secure an adequate water supply, and a Government battery to treat the stone was erected. It was confidently predicted by many of the mining authorities who visited the field that it would rival in richness many of the noted discoveries of Australia. At its first crushing the battery erected by the Tarcoola Blocks Company crushed 384 tons for an average of 3½ oz. per ton. Unfortunately early expectations have not been realised. The Tarcoola Blocks Company alone remains as a producer, and this property is being steadily developed. To date 7,847 tons of ore have been crushed for 15,178 oz. of gold, and in addition 850 tons have been treated by cyanide for 171 oz. The average number of men employed is from 65 to 70. The average value of the ore has dropped to rather under an ounce to the ton. Attention was diverted from Tarcoola by reports of phenomenally rich finds at Arltunga, in the MacDonnell Ranges, almost in the centre of the Continent, and within the boundaries of the Northern Territory. Claims were rapidly pegged out, prospecting parties were dispatched from Adelaide and Melbourne, as well as from many northern towns. A "boom" took place on the Stock Exchange, but disappointing returns were received, and the excitement died away without the field having been properly tested. For many years individual miners have recovered payable quantities of gold from the MacDonnell Ranges, which are reputedly rich; but as a field for extensive operations Arltunga has yet to be proved. Regarding this locality, the Government Geologist has made the following hopeful remarks: "The MacDonnell Ranges extend more or less intermittently into Queensland and westwards towards Western Australia, and there is a vast area available for prospectors in both directions. At Arltunga the reefs outside the White Range are of small size, but have been, and will continue to be, mined profitably. With the exception of those at the White Range, up to the present no gold-bearing deposits has been found suffi-

ciently large or extensive to be worked on a large scale. This fact need not, however, preclude the future discovery of larger deposits elsewhere, or the finding of these by deeper sinking on some of the present known auriferous reefs. Winnecke's Goldfield.—Although the lodes hitherto discovered are small, some of them contain rich ore. After further exploration at depth large and deeper deposits may be found. When facilities have been provided for the extraction of gold from the ore a field for the employment of parties of working miners, and, in some cases, for joint-stock companies, will, I believe, be established."

The discovery of silver lead ore at Glen Osmond, about five miles from Adelaide, was the first indication that South Australia possessed mineral resources. In 1838 some blocks of what was supposed to be limestone cropping out of the side of the hill were found to be pure galena. An assay gave 75 per cent. of lead and about 18 oz. of silver to the ton. Smelting works were erected in the neighborhood, but the venture did not prove remunerative. Silver and lead are widely disseminated through the State, and amongst the most noteworthy mines may be mentioned the Talisker, Ediacara, Aclare, Avondale, Almanda, and Eukaby. The first-named, situated at Cape Jervis, was opened in 1862, and was worked for ten years. The surface ores were very rich in silver, and the mine is still regarded as very valuable. Comparatively little work is being done on our silver-lead mines at present, but if at any future time the ore is raised or the metals extracted at less cost than at present, the abundance of galena to be found in South Australia, and the silver ore yielding as high as 30 per cent., should prove highly remunerative.

South Australia possesses an abundance of iron. Many deposits are in close proximity to railway lines and the sea coast. Large quantities of iron raised in the State are used as flux for smelting purposes, and in most localities the ore carries a small percentage of gold. When giving evidence recently before the Federal Royal Committee appointed to enquire into the provisions of a Bill relating to bonuses for the encouragement of the manufacture of iron in the Commonwealth, Mr. H. Y. L. Brown, Government Geologist, stated that South Australia was capable of supplying all the ore required for smelting works for centuries. He was not, however, prepared to say what kind of iron the ore would make, but did not think it advisable to smelt on the spot, but to ship the ore to some place where coal could be easily got. He instanced numerous places where some millions of tons of ore were available. Within thirty miles of Leigh Creek, and three miles of a railway, there is reported to be a hill of the purest iron to be found in the State, and many thousands of tons could be easily broken down. On Beltana sheep run, within twenty-six miles of Leigh Creek, there are outcrops and well defined reefs carrying rich ores, covering large areas, also manganese. Twenty-five miles south of East, near Mount Serle, there are huge outcrops of massive iron ore, some hundreds of thousands of tons being visible. Near this is a very large body of manganese. At and near Boolyeroo goldfield, six miles east, outcrops of iron ores are to be seen. The seaport would be Port Augusta, distant 169 miles. The best known deposit at present being worked is the Iron Knob, a veritable hill of iron of high percentage, about fifty miles from the Spencer's Gulf seaboard. The property on which the deposit occurs has been leased by the Broken Hill Proprietary Company, which has constructed a railway to the coast to facilitate the transport of the ore to the company's smelting works at Port Pirie.

So far as is known there are no coal measures in South Australia of the age of those that are worked in New South Wales. There is a great gap in the series of formations, namely, from the lower palæozoic (Cambrian, Silurian, and Devonian) to the cretaceous; none of the intervening rocks in that series having been observed outcropping upon the surface. Although this is unfortunately the case, still it is considered possible that beneath the thick deposits of tertiary and cretaceous age, which overlie the greater part of the older rocks, there may exist any of the older formations which occur in other parts of Australia. In 1890 boring for coal was started at Leigh Creek, and not long afterwards the labor of those concerned was crowned with success. The fuel, however, differs



J. Jobson photo. *Silver-Lead Smelting Works, Port Pirie.*

from the bituminous coal of Great Britain, New South Wales, or Victoria, and in some respects resembles the dense brown coal of Europe. When lighted it burns well, but the absence of cinder and the powdery ash produced render it difficult for economical use on ordinary fire bars. Tests made by the locomotive department of the railways proved that the coal was not as well adapted for use on the railways as that of New South Wales.

The large extension of the use of artificial manures by farmers in this State causes great importance to be attached to the existence of rock phosphates. Partly as the result of a reward offered by the Government for the discovery of beds of this material a diligent search was instituted. Deposits have been unearthed at Clinton and Robertstown, both within comparatively easy distance of Adelade, and these are being worked.

Precious stones are known to exist in various parts of the State. At present the gem fields of Kangaroo Island are attracting a good deal of attention. Tourmalines are being mined in considerable quantities, and it is hoped that other precious stones will be found in sufficient numbers to cause this branch of mining to be profitable. Some of the tourmaline crystals brought from Kangaroo Island are described by the Government Geologist as the largest which he has seen in Australia.

Though not a mineral in the ordinary sense, salt must be regarded as among the wealth-producing agencies of the earth. Twenty years or so ago comparatively little salt was produced in South Australia, but owing to the systematic working of the lakes in different parts, principally at the south-eastern portion of Yorke's Peninsula, last year the exports amounted to 37,500 tons. An important industry has been established, giving employment to a great many men both directly and indirectly. Though geographically outside of South Australia, mention should be made in this chapter of the Brokn Hill silver-lead mines situated sixteen miles east of the boundary in New South Wales. These wonderful and world-famed deposits were discovered in 1883 by a boundary rider employed on the Mount Gipps sheep run while mustering sheep in the Broken Hill paddock in the neighborhood of the township subsequently formed and named Silverton. Leases were applied for, and the Broken Hill Mining Company formed. In 1885, as the result of a rearrangement, the celebrated Broken Hill Proprietary Company, Limited, came into existence. From the start South Australian capitalists and miners were largely responsible for the

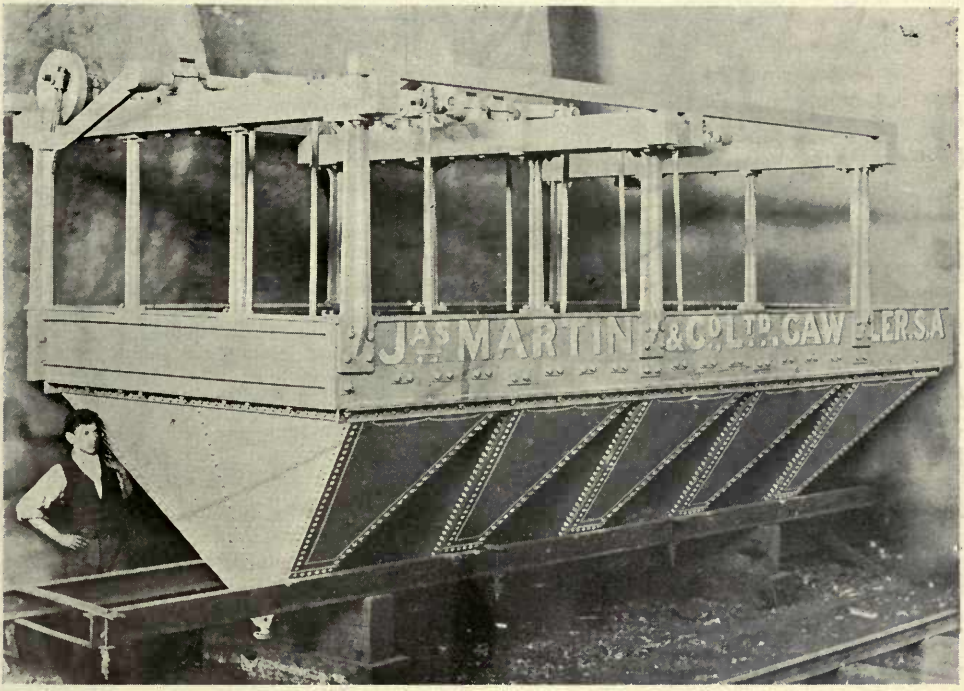
opening and working of these phenomenally rich hills of silver. At the outset the mines were worked as silver propositions, but of late years the lead contents of the ore have predominated. A railway was run to the Barrier as an offshoot of the Great Northern system of this State, and all the material required for the mines and the supplies for the city which grew up around them, as well as the ore recovered, had to pass through South Australia. It is little wonder, therefore, that for all practical purposes Broken Hill has come to be regarded as an integral part of this State. Despite labor troubles, water famines, and low-grade ore problems, the Broken Hill mines continue to constitute a source of wealth to all concerned. Last year's total exports from the district amounted to £1,327,350, of which concentrates accounted for £912,500, slimes £30,121, and zinc concentrates £239. The recovery of a larger percentage of the component metals from the huge heaps of tailings at the mines is now occupying attention of the managements of the respective mines. There is good reason to believe that in one or two instances the solution of the problem has been reached. Experiments in other directions are still being conducted, and it is hoped that before long the now neglected tailings heaps will yield large profits.

A chapter on mining may not be inappropriately closed by a reference to the fact that the South Australian public has for many years been notoriously speculative. Even in the early days, when the mines of the Northern Territory were the chief source of attraction a number of kindred spirits gathered regularly in the city for the purpose of dealing in shares. Western Australia as a mining field was brought into prominence principally by "t'othersiders" drawn from South Australia, and for years the Adelaide market in stocks of companies formed to develop leases in the western State was the most active of any of a similar nature. In 1893 a syndicate was formed in Adelaide for the purpose of sending a prospecting party to Western Australia. There were ten shares of £15 each. Within five years that £150 had been the means of giving birth to properties valued at £30,000,000!

Adelaide boasts of a handsome Stock Exchange building, which is the headquarters of a body of sharebrokers who for business acumen and enterprise are not to be surpassed in the Commonwealth. At the same time it should not be omitted that not once the reproach has been cast up to South Australians that they are far more ready to provide capital to develop mineral resources supposed to exist hundreds of miles away than they are to prospect their own country. Critics have also complained that too much mining has been done on the "Corner" in Adelaide, and too little in the undoubted mineral-bearing country within the boundaries of the State. What justification exists for these strictures this is scarcely the place to enquire. It may be said, however, that recent experience suggests that something requires to be done to cause the active dealing in shares at certain periods and the too spasmodic scientific development of the country to stand in a more exact proportion to one another. It has been pointed out with some reason that existing legislation, which permits the formation of no liability companies for the working of mineral claims, while possibly providing a very necessary safeguard or the dealer in scrip, does not sufficiently provide for the raising of capital, nor does it recognise other abuses which creep into company formation.

The Mining Laws.

Mining in South Australia is regulated by the Mining Act of 1893, which is characterised by extreme liberality and the inducements offered for prospecting an enormous area of practically new country. A miner's right is obtainable at a cost of 5/. This right holds good for one year from the date of issue, and may be renewed at any time during its currency for another term of one year on payment of 5/. The holder of a miner's right is authorised to prospect on any mineral lands for any metal, mineral, coal, or oil, and to peg out (of the prescribed shape and dimensions) gold, mineral, coal, and oil claims, and also leases of a like nature. A fee of 2/6 is

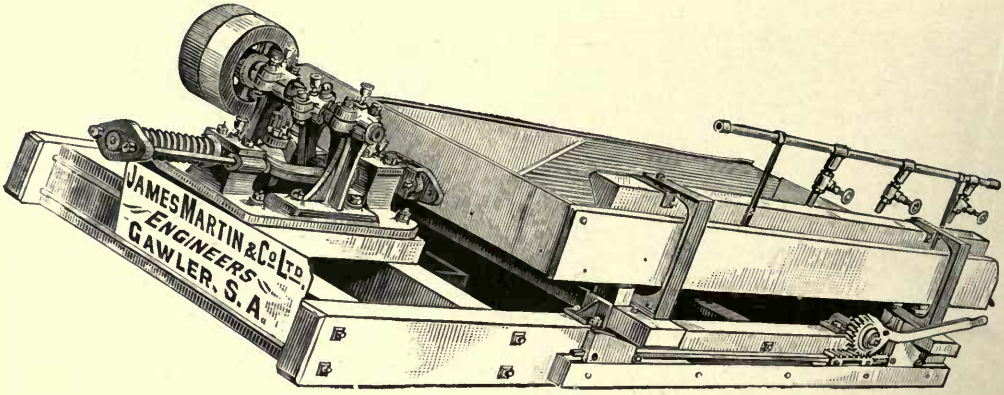


A Double Four-Hutch Plunger Jigger, manufactured by Jas. Martin & Co., Ltd.

charged for registration. Gold claims must be registered at once and mineral claims within thirty days of pegging. The miner's right under which the claim was pegged must be produced to the registrar before registration can be effected, and must be renewed from year to year during its currency, or the claim is liable to forfeiture. Gold claims must be constantly worked—one man for each claim—and mineral claimholders must employ two men for each claim. Amalgamation of either gold or mineral claims reduces the labor conditions by one-half.

Gold, mineral, coal, and oil leases are granted for a term of forty-two years—the two former at a rental of 1/ per acre per annum and a royalty of 6d. in the pound on net profits, the latter at a rental of 6d. per acre per annum until coal or oil is found in payable quantities, when 1/ per acre is payable and a royalty of 6d. in the pound on the net profits. Working conditions provide in the case of gold leases for one man for every five acres; mineral leases, one man for every ten acres; coal or oil leases, one man for every forty acres. The Minister may permit the concentration of labor of the amalgamation of from not more than four adjoining gold or mineral leases. Miscellaneous leases are granted for salt, gypsum, mineral springs, site for smelting works and mining works. Maximum area of leases are—Gold, 20 acres; mineral, 40 acres; coal or oil, 640 acres; salt or gypsum, 640 acres; mineral springs, 40 acres; mining works, 10 acres; smelting works, 10 acres. Any number of gold, mineral, coal, or oil leases may be held by one person.

Under the Mining Act Amendment Act of 1900 licences to search for twelve months for precious stones, mineral phosphates, oil, rare metals, minerals, and earths are issued on specific mineral lands, not exceeding five square miles in area for one person, a fee of 20/ being charged for each square mile or portion thereof. These licences give a preferential right to a lease over a portion of the area, as prescribed.



The Phœnix-Weir Vanning Table, manufactured by Jas. Martin & Co., Ltd., Gawler.

Subsidies are granted upon the recommendation of the Government Geologist and Inspector of Mines to persons or companies engaged in deep sinking, prospecting, or mining; and diamond drills are loaned under special conditions, and rewards for discoveries are paid out of money appropriated by Parliament for that purpose. A rebate of one-third of cost of freight if carried over the railway line for treatment is allowed to prospectors on the first 50 tons of ore raised—a concession which is largely availed of, and greatly assists prospectors in the initial development of their properties. Assays are made at the School of Mines free of cost for all samples obtained from Crown lands, while special arrangements for practical work in the laboratory can be made at very low fees.

Respecting mining on private property the Act 1888, and amending Acts of 1895 and 1899 provide for the resumption of private lands, proclamation of private land as an alluvial goldfield, and compulsory mining leases. In 1882 a Government Geologist was appointed, and results amply justified the wisdom of this step. In Mr. H. Y. L. Brown the State possesses an able, energetic, and withal cautious official, who has done much to help forward the mineral industry of the South Australia. His efforts are well supported by the Inspector of Mines, Captain W. H. Matthews, and the other members of the Mines Department, which comes under the control of the Minister for Mines. No genuine prospector will appeal in vain for advice to the department, while long distances are annually travelled by the officers in reporting upon or inspecting likely properties.

A. M. Ellery, photo.

A View of Mount Gambier.

Manufactures.

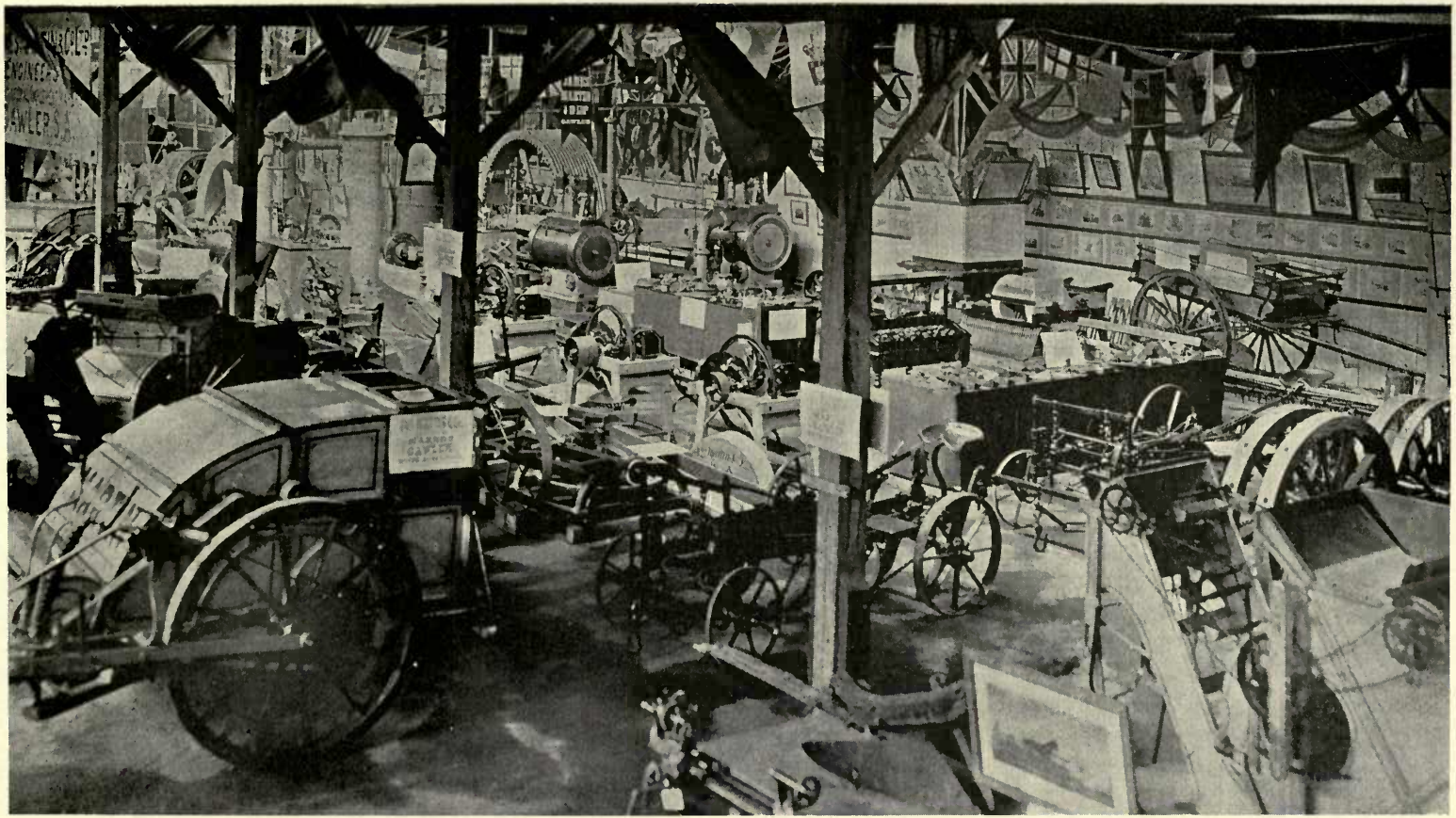
Although essentially a country of primary production, the conversion of raw material into commercial articles received early attention. For some time secondary production was mainly in the direction of providing agricultural implements and commodities required by those who were engaged in occupying the country. As conditions became more settled industries increased in number and variety, and now that Federation has given Interstate Free-trade, manufacturers are looking forward to growing markets throughout the Commonwealth. The discovery of silver in the western districts of New South Wales, and the opening up of some of the richest silver mines in the world, proved a great boon to South Australian manufactures. Engineering firms and boiler makers received large orders, and, by the excellence of their work, have retained valuable connections with Western Australia. Considerable assistance has been given to the industry during the past thirty years by a Chamber of Manufactures, an active organization which holds exhibitions, and in other ways promotes the interests of manufacturers. The following are the published returns of manufactories and the hands employed:—

Year.	Establishments.	Males.	Females.	Total hands employed.
1885 ...	646	7,952	1,350	9,302
1892 ...	815	9,642	1,847	11,489
1896 ...	767	10,974	1,811	12,785
1899 ...	841	12,941	2,214	15,155
1900 ...	1,036	14,800	2,859	17,659
1902 ...	1,275	15,268	3,512	18,780

As the production of grain increased flour mills were started in the city and at Port Adelaide, and the manufacture of breadstuffs became an established industry. At the present time there are 65 flour mills in various parts of the State, and the South Australian article finds a ready demand throughout Australia, South Africa, and Java. Factories devoted to the making of agricultural implements number 31, employing 283 hands; chaff-cutting 53, with 285 employees; boots and shoes 78, 1,239; tanneries 21, 296; brick-making 47, 285 hands; coachbuilding 28, 365; aerated waters, 30, 193; breweries 23, 348; distilleries 9, 72; clothing 252, 2,771; and sawmills 27, with 370 hands. Extensive locomotive workshops are established near Adelaide in connection with the State railways, and the making of cast iron pipes for water reticulation is also carried on by the Government.

The Leading Engineering Works of the State.

The premier engineering firm of South Austalia is James Martin & Co., Limited, of Gawler. The history of this company reads like a romance. The foundation of the concern was laid in 1848 by the late Hon. James Martin, M.L.C. After arriving in a dray, which contained all his belongings—his wife, furniture, and a few tools, the enterprising young colonist cut down a tree, constructed benches and a lathe from the timber, and started business as a bullock-dray maker! The original site comprised only a few feet; the area now occupied by the firm which has grown out of that humble beginning is 18 acres. Mr. Martin began operations with one man; to-day about 600 are employed. From the manufacture of bullock drays Mr. Martin took up the construction of reaping machines and other agricultural implements; then he extended his operations to mining machinery, and now the establishment produces locomotives, which are declared to be equal to any made in the world! At first the trade was strictly local; then the reputation of the firm—for Mr. Martin soon took unto himself partners—rapidly spread into other districts, and demands for agricultural machinery flowed in from all parts of the State. Later orders were received from other States, and to-day the business of



The Exhibit of Jas. Martin & Co., Ltd.. Gawler, at the Century Exhibition, Adelaide, March, 1900.

James Martin & Co., Limited, has ramifications in all parts of Australia, and extends even to South Africa, New Caledonia, and South America.

It is estimated that the firm mentioned have constructed more than 16,000 reaping machines. Latterly they have taken up the manufacture of complete harvesters —machines which strip, winnow, and bag grain in the one operation. The enterprise of building locomotive engines has turned out to be a complete triumph. Two contracts, comprising 144 engines, have been fulfilled for the South Australian Government, and a third, for ten locomotives, is now in hand. Engines have also been made for New South Wales, West Australia, and Tasmania.

More mining machinery has been turned out by James Martin & Co., Limited, during the last twenty years than by any other firm in Australia. It has supplied West Australia with more mining plants—crushing, winding, pumping, concentrating, cyaniding, and roasting—than any other establishment, either colonial, European, or American. It has also assisted in the development of the Broken Hill mines and other mineral properties in the Commonwealth. Specialities are made of copper, tin, gold, and lead concentration and copper and lead smelting. Most of the firm's output is for export—about 90 per cent. on an average. Some time back 39 trucks of machinery, weighing more than 200 tons, and having a value of upwards of £10,000, were dispatched in one day. The late Mr. Martin had very little capital when he started: it now takes £150,000 to run the business.

A striking display of the firm's manufactures was given at the last Exhibition of the South Australian Chamber of Manufactures in Adelaide. The floor area covered by Messrs. Martin & Co.'s specialities was 294 ft. in length, with an average width of 46 ft., and the value of their contribution to the exhibition exceeded £8,000. In point of variety and value this display of engineering exhibits has never been equalled by anv other Australian manufacturers. The collection included a Cross compound engine and a winding engine in motion, two filter presses, an air compressor, three geared engines, jiggers, refrigerating, and ice-making machinery, general engineering exhibits and agricultural implements of every kind.

Of those who have this great business now in hand, Mr. J. F. Martin is chairman of directors, Mr. J. F. Pearson, general engineer, and Mr. James Fergusson, manager of the Agricultural Department.

In honor of the great services rendered by the late Hon. James Martin to the town, industrially and otherwise, a handsome marble statue was recently erected in Gawler as the result of public subscriptions. The unveiling ceremony was performed by His Honor the Chief Justice (Sir Samuel Way, Bart.).

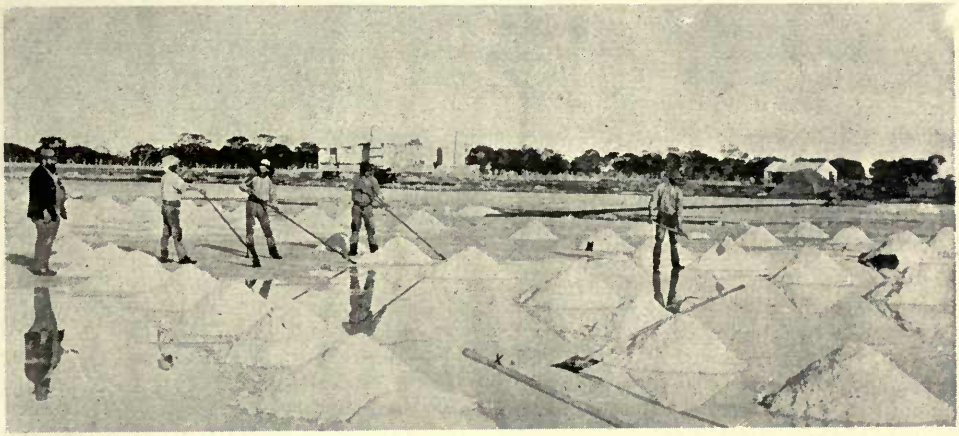
Salt Refineries.

There are a number of fine natural salt lakes in South Australia. This State led the way in the Commonwealth in giving a commercial value to the crude article. There was the usual prejudice to the "colonial" product, but well-equipped refineries were established, and gradually imports of salts decreased and shipments of locally refined salt increased. The following figures serve to indicate the movement:

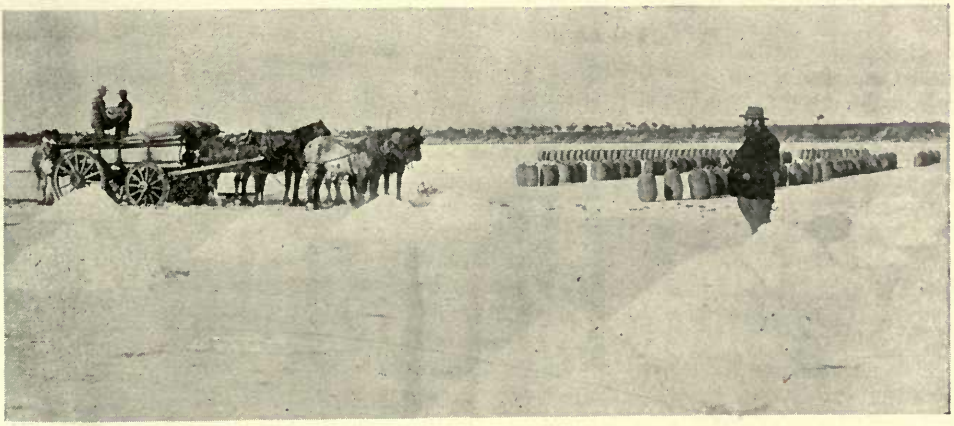
	Imports. Tons.	Exports. Tons
1891	1,225	7,505
1894	763	7,624
1897	136	28,804
1900	201	33,424
1902	—	37,570

There are two refinery companies doing business in South Australia—the Castle Salt Company, of which the directors are Messrs. S. J. Jacobs, Hon. W. B. Rounsevell, Messrs. Pearce Delbridge, James H. Phillips, and Charles H. Warren, and Secretary, Charles Allen; and the Colonial Refining Company, the directors of which are Messrs. R. Strachan (Chairman), James Harvey, and E. J. Green, and Secretary, Mr. R. J. Wyllie. The accompanying photographs show the Castle Salt factory and views of the extensive lakes and methods of gathering the salt.

Portion of the Castle Salt Company's Factory, Edithburg.

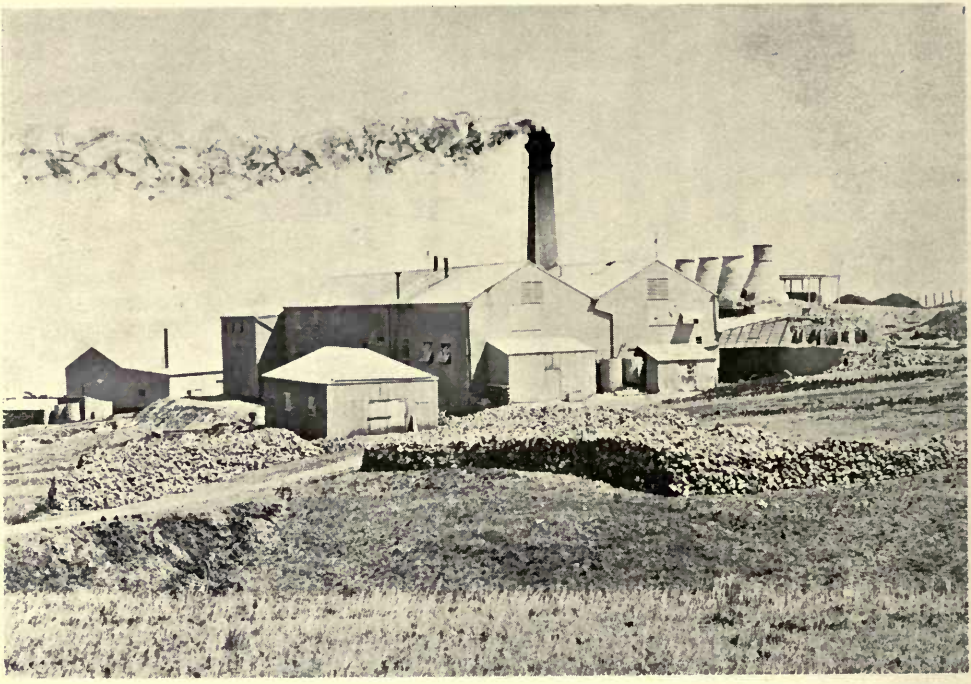


Scraping Salt on Lake Parawurlie, Southern Yorke's Peninsula, the property of the Castle Salt Company, Limited.



Salt bagged ready for carting, Lake Monkawurlie, the property of the Castle Salt Company, Limited.

W. Riddle & Son photos.



The Works of the S.A. Portland Cement Co., Ltd., Brighton.
H. Krischock photo.

One of the most interesting and also important industries in the State is the manufacture of cement. When deposits of blue cement rocks were discovered within a few miles of the spot where the pioneers landed and the proclamation was made by Governor Hindmarsh, tests were at once made to prove whether or not high-class cement could be made. The reports of experts were eminently satisfactory, and from small beginnings an industry of increasing importance has resulted. The South Australian Portland Cement Co., Limited, has only been in existence some eleven years, but the works near Brighton have had to be enlarged several times, and the output has been greatly multiplied. There was the usual prejudice against the "colonial article" to overcome, but once the cement began to be used in Government works and private undertakings, its quality stood all the tests of engineers and time. Local cement was used in the construction of the tunnels at the Happy Valley Waterworks, the weirs and channels of the Bundaleer waterworks, and most of the large buildings recently erected in the city, including the School of Mines, Art Gallery, Children's Hospital, Conservatorium of Music, Adelaide Steamship Co.'s offices, Brookman's Building, &c. South Australian cement is largely used in the building of large cement wine vats, and is also favored by the Corporation of the City of Adelaide and large mining companies. The Government has purchased and used large quantities in connection with the building of reservoirs. A considerable trade is also done with neighboring States, where the article is regarded with much favor. The works are situated near Brighton, and only about seven miles to the south of Adelaide. The directors of the company are Messrs. J. H. Angas, S. Newland, and E. H. Bakewell (managing director), and the manager, Mr. Stanley Fraser.

Forest Culture.

South Australia, as in so many other movements, was the first State of the Australian group to establish State forests. Early settlers were permitted to draw upon the supplies of native timber without restriction until it became apparent that the limited extent of natural forests would soon become exhausted. In 1870, Mr. F. E. H. W. Krichauff persuaded the House of Assembly, of which he was then a member, to call for reports on the best size of reserves for forest purposes, where they should be made, the best and most economical means of preserving the native timber on them, and of planting and replanting the reserves as permanent State forests. Three years later the Forest Act became law, and a bonus was offered of £2 per acre of land on which forest trees were planted and maintained for a period of five years. The practical results of this proved disappointing, for little or no effort was made by private landowners to earn the subsidy. The State forest system was inaugurated in 1875, when the Forest Board was appointed, and 195,398 acres were set apart for tree planting and conservation of the indigenous timber by natural regeneration where desirable. Ultimately this area was increased until the first reserves comprised 239,336 acres. Alienations for perpetual leases have reduced the territory under the supervision to about 189,834 acres. The late Mr. Goyder, then Surveyor-General, in his original report, estimated that the expense of the Forest Department for the first year would be £14,357, and for the second year and following years £10,500 a year, making a total for the first twelve years of £130,000. No return was expected for the first five years, but for the next four years Mr. Goyder reckoned on receiving a revenue of £35,000 a year, and of £70,000 a year for the next three, making a total income of £350,000 for the next twelve years. How far these figures fell short of expectations will be seen from the fact that the expenditure in those twelve years amounted to £72,355, and the revenue to £81,066. For the whole 26 years of the forests' history the expenditure has been £170,852, and the revenue £138,439. Mr. Goyder remarked in one report:—"The above calculations do not take into account failure here and there in the growth of trees, but they are sufficient to show the value of the work, and that there is every probability of us being self-supporting, in addition to its vast importance." But in only seven out of the 26 years has the revenue exceeded the expenditure. The best result was in 1887-8, when the receipts amounted to £12,080, and the expenditure to £7,262. The present Conservator of Forests, Mr. Walter Gill, was appointed in 1890, and he has done excellent work with the limited funds at his command. People and Parliament in South Australia have been singularly apathetic in the matter of afforestation, and the pruning knife of economy has more than once been applied to this department. In all the South Australian forests 800 acres of pines have been planted, and nearly half of this area is represented at Wirrabara, where the trees vary in age from one to 25 years. To-day 85 per cent. of the world's timber demand is for pine, and the amount which goes out of South Australia for this useful class of timber is between £100,000 and £200,000 every year. The world's newspaper press alone devours 11,000,000 tons a year for its pulp paper, and in all countries supplies are rapidly being depleted. The Conservator is an extremely cautious man, but after many anxious years he has thoroughly satisfied himself that pines which are suitable to local conditions can be grown in South Australia without risk and with great profit. At Wirrabara there are only 85 acres of pines which might fairly be regarded as having attained timber maturity, and yet last year ways and means would allow of fresh planting to the extent of only 12 acres. Thanks to the copious summer rains—over 5½ inches in the forest last December—the magnificent result of 98 per cent. of "takes" has to be recorded in respect to that 12 acres. About 400 acres are under pine at Wirrabara altogether, and the trees

W. Gill photo. *Telegraph poles. Forest plantation, Kapunda.*

are making splendid progress. On the question of the character of climate and soil for the growing of timber the Conservator of Forest states:—"There are thousands of acres in the State suitable for pinegrowing now carrying inferior timber of practically no value, or scrubby vegetation. The cost of clearing, fencing, and planting varies according to circumstances; but, speaking broadly, a plantation of pines may be established under suitable conditions, and maintained till it represents the gross value already indicated of £200 per acre, at a cost varying from £5 under the most favorable conditions to £10 per acre where more work is needed to prepare each acre for planting. The ultimate return to the revenue shown as probable from the estimates given is surely in itself a highly satisfactory one; but there are other aspects of the matter quite as important as the revenue one. The German forests, which are rightly regarded as of incalculable value to the State, support directly 1,000,000 people in employment; while another 3,000,000 are maintained by industries connected with them. In these days of scarcity of employment for willing hands is the possibility of ultimately retaining in the country money at the rate of £100 per acre (estimating 50 per cent. as the workers' share of the amount produced—i.e., £200 per acre) to be lightly thrown aside? Extensive tracts in the Ninety-Mile Desert will grow the Maritime pine, which, from careful observations regarding the behaviour of trees planted there, is evidently more at home in that locality than in other parts generally considered far better country. Once let pine forests be established there and the problem as to the possibility of its utilization would be far on towards a satisfactory solution. Making and maintaining forests means that men must be employed to do it. It will pay well, given the requisite time and patience for development. It will pay in revenue; but it will pay better, there and in other districts, in the healthy strong men it rears amidst healthy forest conditions—in the increase of the producing power of the country, and in assisting to prevent the congestion of our generation in our cities."

In answer to the question, "Can South Australia grow any pine timber?" the Conservator of Forests reports:—*a*. Some pines, the timber of which for generations has been a main source of supply in the European markets, cannot be grown here because the climatic conditions are un-

Date Palm in bearing, carrying 100 lbs. dates, Government Plantation, Hergott Springs, 400 miles north of Adelaide.
W. Gill photo.

suitable anywhere for their proper development. *b.* Even if in some localities climatic and other conditions are favorable for the growth of some species, the area where these conditions exist is either required for other purposes generally considered more important than timber growing, or it is of too limited an extent to produce timber in sufficient quantities to prove of any appreciable value in providing an efficient supply for the State's demand for coniferous timber. *c.* The experiments made by the Forest Department during the last 25 years have been carried out, for the most part, in districts in the State where the best all-round conditions do not prevail. This circumstance has a specially important bearing on the question under review, as it is in connection with the work of the department that the necessary facts are forthcoming to solve the problem of pine production. So far, of course, as some pines are concerned, it is a distinct disadvantage that they cannot be grown here; but, on the other hand, as an offset against this, it must be remembered that the growth of some pines here is so rapid that they will attain certain given dimensions in from one-third to even one-half less time than in some other countries. Numbers of different pines have been planted in various parts of the State by private owners on their estates; no expense has been spared in many instances, and, as a result, some fine collections of conifers are to be found, which speak volumes for the arboricultural enthusiasm of those possessing them. An inspection of such trees as these affords great pleasure to a forester; it gives ample opportunity to note the general habit and balance of each tree when growing by itself, with ample room for development as an object of beauty in the landscape."

In reply to the question, "Can South Australia grow pine timber?" the Conservator of Forests gives an emphatic affirmative. The pines can be cultivated on a commercial basis, a fact now being demonstrated by the department in the making of fruit boxes.

The revenue of the department for the last few years' operations shows an increase of £1,516. The department also controls three date plantations, comprising 3,000 palms. Dates of excellent quality have been produced in varying quantities eleven years in succession.

The Shipping Trade.

The shipping trade has always occupied and must retain an important position in the development of South Australia. It cannot be otherwise with a producing country of extended coastline situated thousands of miles from the chief markets of the world. Notwithstanding a splendid Interstate railway system, the bulk of the produce exchanged with other parts of the island continent is transported by water. South Australia has 2,000 miles of coastline within her own borders, thus making necessary the employment of a fleet of coasting vessels. The development in the maritime branch of industry within the short period of the State's existence has been no less marvellous than in other directions, and the achievements are as worthy of being recorded even though they form part of a world-wide movement. Especially is this true of the bringing into existence of a distinctly Australian mercantile marine in which South Australian enterprise and capital have played an important part. The history of South Australian shipping is the record of the rise and development of long distance steam communiaction by water. It was a year after the province was proclaimed that Brunel demonstrated that a regular steam service could be maintained between the United Kingdom and the United States of America. Experts at that time considered that steamers would never be able to make the voyage to India, much less to Australia. The first steamer entered Sydney harbor in 1831. Attempts were made soon afterwards to establish regular steam communication with the newly-founded British dominions beyond the seas, but as the Cape route had to be followed the cost of coal proved prohibitive. For many years South Australia had to depend for intercourse with the old world upon a type of sailing vessel long since obsolete, manned by as intrepid navigators as ever sailed the ocean. Later on came the clipper barque which made such remarkable passages. Then followed the ocean leviathan, cutting off corners, and making the voyage as safe and regular in point of time—and indeed more so—as the Channel service between England and France was half a century ago. What may be regarded as the first trading vessel to touch these shores was the Duke of York, the pioneer ship chartered by the South Australian Company. This barque, of 197 tons, in command of Captain R. G. Morgan, anchored in Nepean Bay, Kangaroo Island, on July 27, 1836. She brought 36 immigrants, and was followed on August 2 by the Rapid, with Colonel Light on board, by the Lady Mary Pelham and the John Pelham about the same time, and by the Buffalo, with Governor Hindmarsh, in December of the same year. At that time over 100 days was required to complete the voyage from England to South Australia. Mails are now delivered within the month, and this time could be considerably reduced by the completion of the railway from Adelaide to Port Darwin. The State in its early years of existence was dependent much more than it is to-day upon the maintenance of communication with the outside world. Machinery and implements, and even food supplies, had to be imported, whilst the little community depended from the outset upon securing distant markets. Thus the foundation was laid of an oversea and Interstate trade which annually reaches many millions sterling. The commerce of South Australia was first carried on by means of wooden sailing vessels. The early arrivals included such names as the Africane, Orleana, Platina, Hoogly, Lalla Rookh, and Competitor. In those days a vessel of 500 tons was considered a large craft. These ships with bluff bows have passed out of recollection. About the sixties composite vessels having iron frames and wooden planking began to become popular. Among the best known of these were the Glen Osmond, Beltana,

A Busy Wharf, Port Adelaide.

Collingrove, and Torrens, the last named being still in the trade. In the wake of the composite vessels came those constructed of iron, and native names were perpetuated in the Barossa, Barunga, and Kadina. Clipper built barques sprang into prominence about this date, and surprisingly smart were some of the passages logged by wool laden "wind-jambers" timed to catch the London sales.

"Built for freight and yet for speed,
A beautiful and gallant craft."

The last stage in the evolution of sailing vessels was the substitution of steel as the material of construction.

Half a century of progress is shown in the following table of entries and clearances at South Australian ports:—

	Inwards.		Outwards.	
	No.	Tons.	No.	Tons.
1850	284	86,583	275	87,872
1860	324	100,681	338	108,355
1870	445	140,081	471	147,908
1880	1,045	590,085	1,111	610,819
1890	1,041	1,075,133	1,081	1,115,309
1900	1,010	1,780,383	1,003	1,772,253

The most significant change in the shipping industry was the superseding of sail power by steam. The bulk of South Australia's oversea traffic is now conducted by large steamers ranging up to 10,000 tons, and these almost invariably bring cargo

for more than one State. Consequently, their stay in port is not a fraction of the time which used to be spent by the old-style traders which ran direct between Port Adelaide and the United Kingdom. The evolution from sail to steam and the growth of tonnage is illustrated by the following table of arrivals in South Australia:—

	Sail Tons.	Steam. Tons.	Total. Tons
1848 ...	All sail		46,640
1858 ...			98,302
1868 ...			136,051
1878 ...			452,738
1888 ...	225,098	748,381	973,479
1898 ...	156,753	1,565,605	1,722,358
1902 ...	155,014	1,789,598	1,944,612

The first steam communication between England and South Australia was opened in 1852 via the Cape of Good Hope. The service did not last long. The same year, however, a branch line was established by the P. and O. Company between Singapore and Australia. In 1857 the need of an improved connection with the outside world was felt. The Chamber of Commerce, in a petition to Parliament, expressed the opinion that direct steam communication with Great Britain, combined with emigration and a postal service would prove highly advantageous. The opening of the Suez Canal effected a complete revolution in ocean traffic between Europe and Australia. Branch lines became trunk services, and South Australia occupied a more prominent part in the time table of ocean steamers. To-day the steamers of four large mail companies include Port Adelaide in their time-tables, and the flags of three nationalities float over the splendid specimens of marine architecture which regularly convey large numbers of passengers to and from these shores. Increased harbor accommodation is now being provided for these

Swift shuttles of an Empire's loom that weave us main to main.

The growth of foreign shipping visiting South Australian ports has been considerable. The early records of the State do not distinguish between British and foreign-owned tonnage. In those days Britannia "ruled the waves." In 1847, out of 150 ships which arrived in South Australian ports only 7 were from foreign States, and even these were not necessarily owned by foreign powers. In 1859 the number of vessels flying other than the Union Jack on arrival was only 20, representing 20,189 tons, out of a total of 429 vessels of 114,951 tons. Ten years later the proportion was about the same—34 ships of 14,852 tons under foreign register, and 629 ships of 174,361 tons of all nationalities. In 1901, out of 1,072 vessels which arrived, no fewer than 910 were British-owned. It is only of comparatively recent years that foreign shipowners have considered it worth while to make an attempt to capture a portion of the Australian carrying business. The North German Lloyd Company extended its service so as to include this State in 1885, the Messageries Maritimes steamers first visited Port Adelaide in 1883, while the German Australian line, which caters entirely for cargo, became a factor in 1889. The influence of these liners is easily traceable in official records. In 1902, for example, total arrivals of shipping were 999 vessels of 1,944,612 tons, of which 864 ships of 1,609,669 tons were British, and 135 ships of 334,943 tons were foreign. It is important to bear these figures in mind in endeavoring to trace the growth of inter-Empire trade. Owing to the establishment of direct lines of steamships between European and Australian ports, and to the decline which has taken place in consequence in transhipment at London trade returns do not credit the United Kingdom with importing as much of the produce of the State, as formerly when a proportion of that shown as shipped to the motherland went into consumption in foreign countries. From 1886 to 1893 1,163 vessels cleared for the United Kingdom, representing 2,188,479 tons. During the succeeding eight years the number fell to 995, though the tonnage increased to 2,446,770 tons. To foreign States in the earlier period clearances numbered 463, aggregating 820,923 tons, and from 1894 to 1901, 535, 1,346,822 tons. In 1882 no vessels cleared direct for Germany; in 1902 the number was 32, of 131,049 tons, all of which were under foreign flag.

Commercial Road, Port Adelaide.

In 1901 vessels were dispatched from all South Australian ports chiefly as follows:—To United Kingdom, 140, of 384,033 tons; to New South Wales, 382, aggregating 652,699 tons; Victoria, 227, 469 208 tons; Western Australia, 138, 203,227 tons; Tasmania, 43, 6,073 tons; New Zealand, 15, 10,928 tons; Cape Colony, 39, 39,895 tons; Natal, 19, 30,167 tons; France, 15, 40,854 tons; Germany, 26, equal to 99,514 tons.

The Interstate Service.

The Interstate shipping business furnishes a picturesque chapter in South Australian history. For many years water carriage was the only means of maintaining relations with the other settled portions of the island continent. The bulk of the goods traffic between the States is still carried on by sea, the proportion being over 60 per cent. of the carrying trade of each portion of the mainland. In 1847 no fewer than 115 ships out of 150 arriving in South Australia came from British colonies. The discovery of gold in Victoria in the fifties led to a rush for berths on every available craft which could be pressed into service. In 1859 clearances for the adjoining State of Victoria numbered 199 ships, of 30,967 tons, out of a total of 319 vessels, of 73,789 tons, including river traffic. Gradually trade became established, a tourist movement was encouraged by the purchase of modern steamers, and, notwithstanding the construction of railways, the coastal service has steadily expanded.

During 1902 arrivals of shipping from Victoria numbered 181 vessels, of 347,813 tons; from New South Wales, 300 vessels, of 549,226 tons; from Western Australia, 144 vessels, of 210,656 tons; from Tasmania, 51 vessels, of 10,560 tons; and from Western Australia, 9 vessels, of 76,153 tons.

The Coastal Service.

The purely coastal trade was carried on in the early days by small sailing crafts, which still constitute the greater number of the vessels engaged. Exclusive of River Murray trade, there are approximately 100 vessels, of 5,600 tons, engaged in maintaining communication chiefly between Port Adelaide and the outports, and of this total 10, representing 1,500 tons, are steamers.

South Australia has participated in the benefits arising from the increase in the size of ships during the past fifty years. Of 102 vessels which arrived in 1828 the largest was 600 tons, and for many years the greater number fell beneath 1,000 tons. Of 315 arrivals in 1868, only one exceeded 1,100 tons, while in 1878 the limit was 2,700 tons. Ten years later no fewer than 40 vessels which reported in South Australia were from 3,000 to 3,500 tons register. Now the majority of merchantmen calling here are of mammoth proportions. As illustrating this, the following list of the largest steamers to so far enter Port Adelaide harbor stands out prominently:—

	Tons gross.	Tons net.
S.S. Manhattan	8,004	6,121
S.S. Maplemore	7,803	5,842
S.S. Jason	7,450	4,800
S.S. Star of Australia ...	7,198	4,668
S.S. Kanowna	6,976	4,399
S.S. Machaon	6,737	4,276
S.S. Commonwealth ...	6,611	4,172
S.S. Ophir	6,910	3,223
S.S. Morayshire	5,576	3,597

Increased tonnage and greater draft of water have necessitated a vigorous policy of harbor improvement. In the early days the mariner had to guard against the danger of having his ship left high and dry on the mud banks when the tide receded. At the present time steamers of from 5,000 to 8,000 tons comfortably berth at the wharves. Captain John Jones was the first mariner to enter the Port Adelaide inlet. In 1836 Colonel Light, in an official report, referred to what was destined to become the chief port of South Australia in the following terms:—"I have no hesitation in saying that with the entrance buoyed ships drawing 16 ft. of water may go in with ease, and when in there is no safer or more commodious harbor in the world for merchant ships." On May 25, 1839, Governor Gawler turned the first spadeful of earth in connection with the construction of a road leading from the river to the high ground at the rear of the swamps. This marked the establishment of the city of Port Adelaide at its present site, the "old Port" having been laid out higher up the river. McLaren Wharf was formally declared open to the commerce of the world on October 14, 1840. Improvements since then have been continuous, it being the boast of the authorities that any vessel which can pass through the Suez Canal may with perfect safety proceed to the wharves. During 1902 the longest vessel to enter the harbor was 469 ft. in length, and the most deeply laden steamer on departure drew 27 ft. 2 in. As, however, there was a depth of water of 33 ft. 7 in. at high water on the day of departure of the most deeply laden vessel, shipowners have no occasion to fear that the river cannot be expeditiously and safely navigated at almost any time. The construction of a first-class harbor at the chief ports of the State has been effected by the outlay of a large sum of money. Total expenditure upon deepening and improving the ports of South Australia to June 30, 1902, exceeds £1,000,000, of which Port Adelaide has absorbed £757,000, and Port Pirie £143,000. The channel leading from the anchorage, where the English mails are loaded and discharged, to the wharves at Port Adelaide, a distance of about nine miles, is deepened to 23 ft. low water springs, but ordinary high water springs give from 31 to 32 ft. of water. The width of the channel is nowhere less than 250 ft., and in some places it is as much as 500 ft. The work of deepening and widening certain portions so as to straighten out curves and make the channel still more easily navigable by steamers of great length is still in process. For the convenience of ocean vessels, especially mail boats able to remain here only a few hours, accommodation is now being provided at Light's Passage at the entrance

Port Augusta.

to the river at a cost of £437,000. That the oversea trade transacted at the Semaphore anchorage almost exclusively by mail steamers is of considerable importance will be gathered from the fact that vessels which called during 1901 had on arrival 519,544 tons of general cargo, of which 25,243 tons were discharged. About a similar quantity of goods was loaded. It is with respect to passengers, however, that it is desired to provide extra facilities, it being recognised that everything possible should be done to induce travellers to break the journey for a few hours and visit the city. During 1901 visiting steamers which did not make their way to the wharves owing to the shortness of their stay, brought 35,882 passengers, of whom 5,000 landed here and did not resume the voyage. It is a tribute to the productiveness of the State that only about 10 per cent. of the ships clearing from South Australia leave in ballast. When the wheat harvest is small the proportion is higher, but exports are now becoming so diversified that over an average of years ballast ships do not amount to more than 10 per cent. of clearances. The fair-way of the river is well defined by beacons, and is lighted at night by a system of leading lights. Port Adelaide has 2½ miles of wharves, mostly privately owned, representing an outlay roughly of a million sterling. Further wharf construction is at present contemplated. A swinging berth 600 ft. long, deepened to 23 ft. at low water, meets the convenience of large vessels unable to turn in the harbor, and a mooring berth 700 ft. long, with a depth of 26 ft. at low water, is available for special occasions, and has been utilised by visiting war boats. Four patent slips privately owned are capable of taking on vessels of from 300 to 1,500 tons, and a company is now being formed to construct a graving dock. There are over 40 proclaimed ports around the coast line of South Australia.

Port Pirie, situated in Spencer's Gulf, ranks next in importance to Port Adelaide. The channel is 150 ft. wide, and is deepened to 15 ft. low water springs from the entrance to the south end of the harbor, two-thirds of which has a breadth of from 350 to 400 ft. Vessels of from 2,000 tons to upwards of 4,200 tons navigate this waterway during high water, with 20 to 22 ft. of water in the channel. Wharfage frontage extends over 4,500 ft. The greater portion of the Broken Hill traffic passes through Port Pirie. The silver smelting works at Port Pirie are

said to be the largest of their kind in the world. At Port Germein, situated ten miles from Port Pirie, is a jetty 5,459 ft. long, is frequented by many large vessels which load wheat drawn from the upper north and middle divisions of the State.

Port Augusta, at the head of Spencer's Gulf, has lost much of its former importance owing to the decline of the pastoral industry in the far North of South Australia. The fine harbor causes Port Augusta to be specially favorably situated with regard to the great interior country stretching to the Queensland and New South Wales borders, which only requires a reliable rainfall to become wonderfully productive. Port Augusta also commands the trade of Central Australia, and in the event of the construction of the transcontinental railway from Oodnadatta to Pine Creek, this outport will be greatly benefited. Wallaroo, further south than Port Pirie, assumes importance as a wheat and copper shipping port, and is a regular calling place with many Interstate steamers. There are large copper smelting works at Wallaroo. Kingston, on the south-eastern coastline, forms the outlet for most f the wool grown in that part which finds its way direct to London. At present an effort is being put forward to secure a harbor for the south-east capable of accommodating deep-sea steamers. Edithburgh, on the south-eastern point of Yorkes Peninsula, has come into prominence of recent years owing to the development of a salt industry in the neighborhood. The following table shows the inward and outward tonnage at the chief ports of South Australia during 1902:—

	Total Trade.	Inwards.		Outwards.	
	£	Vessels.	Tons.	Vessels.	Tons.
Port Adelaide ...	9,212,509	785	1,710,501	756	1,713,516
Port Pirie	1,995,679	52	82,647	101	159,958
Wallaroo	580,685	62	97,286	32	45,583
Port Augusta ...	71,142	9	13,349	5	7,563
Edithburg	37,464	7	5,181	54	54,145

The Lighthouse Service.

The coastline of South Australia is remarkably well lighted, especially considering the comparatively short time that the State has been established. The earliest guiding beacon set up was exhibited from the mast-head of an old vessel moored outside the entrance to the Port Adelaide River. This light was first shown on July 17, 1840, and it was twelve years later before a permanent mark was erected. Lighthouse construction dates from 1852, when a revolving light on Cape Willoughby, situated on the eastern extremity of Kangaroo Island, was set up. Thence forward as trade increased, and, unfortunately in some instances as disastrous wrecks demonstrated the necessity, fine lighthouses were constructed around the shores of the State. To-day from 14 towers warm rays of light warn of hidden dangers and guide the way into the desired haven. This number is exclusive of smaller local lights, a light ship on Middle Bank, Spencer's Gulf, and the lighthouse at Point Charles, Northern Territory. The total salaries of light keepers in 1856 amounted to only £1,378, but the aggregate expenditure on lighthouses to June 30, 1902, amounted to over £160,000.

Light Dues and Pilotage.

The cost of lighting the coast is borne by light dues imposed on visiting shipping, the sum raised by this means during 1901 being £18,340. In 1845 the Government of the day considered the state of the finances justified the abolition of port charges on ships of all nations without exception. This condition of affairs did not last long, however, and to-day, in addition to light dues, visiting shipmasters, unless they have been successful in obtaining an exemption certificate, have to submit to compulsory pilotage. The minimum rate of pilotage at Port Adelaide is £2/10, and the maximum £12, and a sliding scale is provided on the basis of 1½d. per ton. At

Port Adelaide the pilots are Government servants, the fees going into revenue. Wharfage rates on goods landed and shipped over the various wharves are levied by the various owners. With the exception of an enumerated list of goods, the wharfage rate is uniform at 1/8 per ton weight, or 2/ per ton measurement. The necessity of making South Australian ports as cheap as possible has been repeatedly urged upon the authorities, and as a step in this direction a concession was made not long ago whereby the payment of light dues was made to cover a definite period, one payment being sufficient for any number of visits during the period. During 1901 over £8,500 was paid to pilots through the Marine Department for pilotage services. In addition, tonnage dues are levied by wharfowners upon vessels evading or discharging at the wharves. Facilities for expeditiously handling cargo have greatly increased with the growth of trade. In the fifties the landing of 130 tons of goods at McLaren Wharf, Port Adelaide, in 10 hours was considered a smart piece of work. Nowadays Port Adelaide stevedores who have won a reputation for despatch, can handle as much as 800 tons of goods in the same time.

The Marine Board.

Among the early Acts passed in the colony in the first year of the reign of the late Queen Victoria was one entitled "An Act for the better preservation of the ports, harbors, havens, roadsteads, channels, navigable creeks and rivers in Her Majesty's Province of South Australia, and for the better regulation of shipping and entering crews in the same." Originally the marine administration was practically in the hands of Captain Lipson, who was appointed in England as naval officer and harbor master, and who arrived in the Cygnet in September, 1836. It was subsequently found necessary to subdivide his duties between four departments—Customs, Trinity Board, local Marine Board, and Harbor Trust. The Trinity Board was constituted in 1851, and Captain Lipson was selected as first master of the body. He held office for only three years. The functions of the board were chiefly to license pilots, fix rates, superintend lighthouses, regulate wharves, and supply ballast to ships. Later on the board was charged with deepening operations. Deepening in the Port Adelaide River was started in 1849, but not vigorously prosecuted till 1854. The Trinity Board, finding itself hampered for want of funds, secured a grant of £100,000, and to administer this the four senior members were appointed to give effect to the Act. Thus the Harbor Trust was brought into existence. A few years later the Commissioners passed under the control of the Parliamentary head of the Public Works Department, and to-day all harbor improvements are under the direction of the Engineer-in-Chief. The local Marine Board, of which the late Captain Douglas was first chairman, and Mr. Arthur Searcy is now President, took over and performed for some years the duties discharged by the Harbor Master as shipping master; but in 1860 all earlier enactments were repealed, and the Marine Board of South Australia constituted to generally administer marine matters. For years the Government nominated members, but in 1881 that system gave way to semi-election, and at present three members of the board are appointed by the Government, representation being conceded to seamen and engineers; two are elected by shipowners and one each by the Chamber of Commerce and the Marine Underwriters.

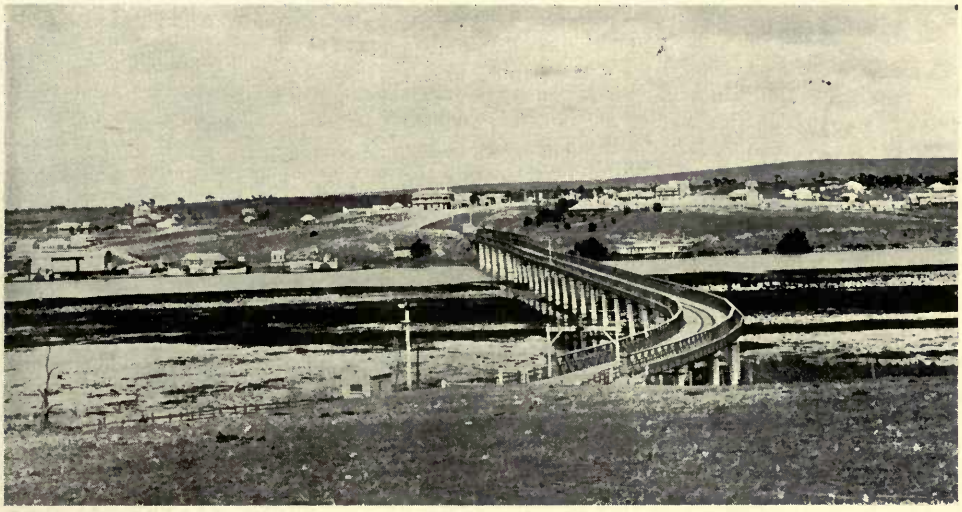
The Ocean Mail Service.

The development of the shipping industry has had a most important bearing upon the conveyance of mails between the United Kingdom and South Australia. In the early days the service was maintained by sailing vessels, and the time of arrival being very uncertain, the presence of a boat in the offing caused great excitement. For many years there was no arrangement with particular lines. Letters were

brought by any outward-bound crafts. Among the best known were the clippers of Captain Angel and Messrs. Elder, Younghusband, and Levi. The bags were landed in whale boats and taken to Adelaide by road. In 1844 a regular line of sailing packets having been established between London and Sydney, the bulk of the mail matter was forwarded by this route. The average time occupied was 158 days. The first regular steam communication was established in 1852 via the Cape of Good Hope, the contract time from Plymouth to Adelaide being 68 days. The initial mail, consisting of 1,799 letters and 3,618 papers, arrived by the Australasian on August 29. The service was terminated by the failure of the company, and sailing vessels were again resorted to, until, in 1853, contracts were entered into with the P. & O. Company for a mail every two months via Singapore. In 1855 the steamers of this line and those of the General Screw S.S. Company, with which an arrangement had also been entered into, were taken off to convey troops to the Crimea, and colonists were again left dependent upon sailing ships. Letters were forwarded to Melbourne twice a month. Even when a few years later the British Government entered into a contract with a steamship company, Melbourne was made the distributing centre. In 1860 the P. & O. Company again appeared as a contractor, and maintained a monthly connection between England and the colonies. South Australian letters were delivered at Kangaroo Island. A year later the route was altered. This State was ignored, and it became necessary for the Government to establish a branch service between Albany, in Western Australia, and Adelaide. In 1874 a new system was inaugurated whereby the British Government carried the mails as far as Galle, and the Victorian authorities connected from Colombo to Melbourne. This State had to pay £5,000 for the steamers to call at Glenelg. Some years later better facilities were provided with the P. and O. Company, which, in conjunction with the Orient Company, gave a weekly service between Europe and Adelaide. This was the first Federal arrangement come to, and the contract still holds good. Owing to the construction of a line of railway between Adelaide and Melbourne, this State is now made the embarking and disembarking point for the mails for Eastern States. The rail was first utilised in conjunction with the steamers, which afterwards resume the voyage to Melbourne and Sydney, in 1887. The present agreement expires in 1905. The contract time is 686 hours from Brindisi to Adelaide. The Post and Telegraph Department, having been taken over by the Federal Government, the conclusion of mail contracts between South Australia, as a part of the Union, and the United Kingdom has now to be negotiated by the Commonwealth Government. The number of ship letters which passed through South Australian post offices in 1901 was 4,745,070 out of a total of 21,401,518. In 1887 the number of ship letters was 2,237,699 out of an aggregate of 15,181,309. Newspapers brought into South Australia or sent away by sea numbered 1,622,788 out of 7,376,953 in 1887, and 3,144,128 out of 9,827,071 in 1901.

River Murray Trade.

South Australia has always been deeply interested in the maintenance of a highway by water into the interior of the Continent, and has taken a leading part in the navigation of the Rivers Murray and Darling. The matter was actively taken up by Sir Henry Young among pioneer Governors, while the names of Captains Cadell, Randell, Johnson, and King will ever be remembered among early navigators of the river who did much to explore its tortuous reaches and demonstrate its value as a highway of commerce. With the settlement of the far western districts of New South Wales and the country on both sides of the Murray an important trade was developed. Large quantities of goods were yearly carried by this means to distant stations, while pastoral produce was brought down to the seaboard. The volume of this interchange amounted in 1882 to no less than £837,704 worth of im-



Murray Bridge.

ports from New South Wales, and £23,555 from Victoria. Exports, on the other hand, came to £346,153 to New South Wales, and £564 to Victoria. Of recent years the construction of railways, the adoption of preferential railway rates, droughts, and the conflict of irrigation interests have caused this valuable trade to seriously dwindle till, in 1901, river borne imports from New South Wales amounted to only £112,536, and from Victoria to £24,768. Exports in the same year were £36,526 to New South Wales, and £8,801 to Victoria. The question of riparian rights has been debated for many years, during which period the neighboring State of Victoria has been extending diversion schemes till at present there is grave fear that the navigation of the river will be destroyed. Hopes are entertained that the establishment of Federation will ultimately ensure an amicable and just settlement of the river problem. It is provided by the constitution that "the Commonwealth shall not by any law or regulation of trade or commerce abridge the right of a State or of the residents therein to the reasonable use of the waters of rivers for conservation or irrigation." Everything depends upon the construction placed upon the words "reasonable use." Early in 1902 an Interstate Conference was held to consider the question of water conservation, and to South Australia and the back blocks of New South Wales the immensely important matter of locking the river and generally disposing of the water. The outcome of this gathering was the appointment by the Commonwealth Government of a Royal Commission, which brought up a report which threatened to create a deadlock. At a Conference of State Premiers in 1903 the scheme of the experts was somewhat amended, and it was agreed to submit this modification to the State Parliaments of South Australia, Victoria, and New South Wales for acceptance. This agreement was intended to hold good for five years, but it did not prove acceptable, and has not been ratified. The Government of South Australia proposes to construct a barrage across the mouth of the river to keep out the sea and throw back the fresh water into Lakes Alexandrina and Albert.

Vessels Registered in South Australia.

The first vessel registered at Port Adelaide was the Hero, built at the Manning River, New South Wales, in 1837, and transferred to South Australia the following year. The certificate, which is still preserved at the Custom House, sets out that John Barton Hack, of Adelaide, was the sole owner of a vessel of 36 tons, having one deck, one mast, and a length from the inner part of the main stem to the sternpost of 40 ft., a beam of 14 ft., and a depth of 7 ft. She was carvel built, and square at the stern. It is not an easy matter to give an idea of the extent to which tonnage is owned in South Australia. It is impossible to state what amount of South Australian capital is invested in the industry, and the tonnage registered in the State does not throw much light upon this question. The following is an official statement of the number of vessels belonging to Port Adelaide:—

	Steamers.		Sailers.	
	No.	Tons.	No.	Tons
1892	90	15,852	215	23,909
1893	92	15,331	212	23,571
1894	94	16,146	212	22,880
1895	95	17,715	214	22,930
1896	103	29,073	215	22,507
1897	109	30,641	217	22,229
1898	107	28,413	222	22,573
1899	108	28,445	227	22,421
1900	107	26,945	216	19,140
1901	109	29,661	218	18,943

It is estimated that close on 300 seamen whose homes are in South Australia find employment in the Interstate and purely coastal trade. The number would be much greater except for the fact that the steamship companies find it convenient to register their vessels in other States and pay wages and effect repairs there. It is hoped that with the construction of the contemplated graving dock at Port Adelaide still more seamen may be induced to establish homes there. The substitution of steam for sail has tended to reduce the number of seamen carried on vessels trading to the State, but at the same time the increase in the size of vessels has counteracted this tendency. This aspect is brought out in the following table compiled from official records and showing entries at South Australian ports:—

Pear.	Tons Entered.	Crews.	Average per ton.
1871	9,152	193,830	21
1881	30,969	640,885	20
1891	52,145	1,287,644	24
1901	61,752	1,966,698	31

It will, of course, be understood that these particulars relate to seamen of all nationalities. Especially interesting just now are the rates of wages ruling on the Australian coast, and the following also from official sources shows the average wages per month paid to seamen who engaged through the Department of Mercantile Marine during 1901:—

	Steamers.	
	Coasting.	Interstate.
	£	£
First mate ...	15 to 16	... 16 to 17
Second mate ...	11 to 13	... 11 to 13
A.B.	6 15/	... 7
O.S.	2 10/	... 3
Boatswain ...	8	... 8
Carpenter ...	9	... 9
Steward	3 to 9	... 3 to 12
Cook	3 to 9	... 3 to 12
First engineer . .	18 to 20	... 20 to 25
Second engineer	16	... 16 to 18
Fireman	8 15/	... 9
Trimmer	6 15/	... 7

Oversea Passenger Trade.

South Australia's great need—as indeed it is of all parts of the Commonwealth—is a larger population. In the early days of the province a system of State assisted immigration was in force by means of which population was attracted to the colony, but this policy was terminated in 1886. Naturally, the human flow was all in one direction in the early days, and by 1849 the excess of immigration over emigration had reached to close on 14,000. In the following year, when the Victorian goldfields had begun to attract attention, the excess had fallen to just over 6,000.

Total immigration during the ten years, 1850 to 1859, amounted to 124,595 persons, of whom 67,815 arrived from Great Britain, 49,309 from British colonies, and 7,471 from foreign countries. The number of immigrants introduced at public expense during the ten years was 50,355—29,675 English, 5,913 Scotch, and 14,767 Irish. The total was made up of 23,690 males and 26,665 females. Of the former 17,331 were adults and 6,359 children, and of the females 19,926 were adults and 6,739 children. Total expenditure upon immigration during the same period was £1,121,731, the average cost to the State being £22/5/6 per Government immigrant, or £19/15 for each individual who arrived and remained in the colony. By the end of the sixties the number of immigrants brought at public expense had fallen very low, and the year before the repeal of the legislation amounted to only 293. The following shows the gain or loss to population by this means, it being understood that the figures since 1886 do not include any State assisted immigrants, that system having ceased at that time:—

Year.	Immigration.	Emigration.	Excess of Immgtn.	Excess of Emigtn.
1847 ...	5,646	885	4,761	
1857 ...	8,138	4,909	3,229	
1867 ...	3,651	4,046		395
1877 ...	15,016	9,008	6,008	
1887 ...	15,468	17,667		2,199
1897 ...	96,827	98,037		1,210
1898 ...	94,060	92,306	1,754	
1899 ...	73,557	71,966	1,591	
1900 ...	77,789	78,624		475
1901 ...	73,780	82,880	900	
1902 ...	71,896	72,810		914

Nunyara Sanatorium for the Open-Air Treatment of Consumption, situated in the Mount Lofty Ranges, Belair, seven miles from Adelaide. Altitude, 1,050 feet.

The State Railways.

Paradoxical though it may seem, it is historically, as well as technically, correct to declare that the first railway in South Australia was a tramway! The earliest rail traction—the pioneer scheme for the transit of goods other than by the roadway—was witnessed early in the fifties. A private company laid down rails between Goolwa and Port Elliot for the carriage of river-borne goods by means of horsepower to the port of shipment. At a later date the system was extended to Victor Harbor, and in due course the locomotive superseded the horse.

But still more surprising facts remain to be stated concerning the establishment and extension of railways in this State. The honor of building the first State-owned railway in the British Empire belongs to South Australia! That claim may sound extravagant, but it can be established beyond doubt. There is another extraordinary fact in favor of this State. In South Australia there are approximately five miles of railway to each 1,000 inhabitants. Compared on that basis, South Australia leads the world as a builder of railways! An influential railway journal admits the accuracy of this, and says: "Comparing the railway mileage of the world, South Australia is first with 52.3 miles for each 10,000 people, this result, of course, being due to the comparative sparseness of the population. In the United States there are twenty-six miles to 10,000 inhabitants." "Sparseness of population" does not take anything away from so creditable an achievement. The "sparse population" pluckily shouldered the responsibility of running a telegraph line through an unknown continent in order to connect Australia and the world beyond, and boldly adopted a vigorous railway construction policy. In a direct line from south to north there is a clear run by railway—unfortunately with a break of gauge—of over 1,000 miles. The total railway mileage open to public traffic is 1,736¼ miles, and every inch of it is the property of the people. The only privately owned line in South Australia is a short span of thirty-three miles built by the Broken Hill Proprietary Company for the carriage of flux from Iron Knob to the sea coast near Port Pirie.

Within ten years of the proclamation of the province a few pushful pioneers wanted to know why George Stephenson should be supplying locomotive traction to Englishmen and South Australians be left to wield the bullock whip, taxing both their strength and their vocabularies! An agitation began late in the forties in favor of linking the city and the chief seaport. A company was formed in 1848 for that purpose, and legislative authority was given two years later for the construction of a railway from Adelaide to Port Adelaide, "with a branch to the North Arm." The latter was never built. The representative of the company had at least three objections to the terms offered. Maximum tolls of 2d., 1½d., and 1d. for first, second, and third classes were claimed. The Government reserved the right to purchase the line, and a limitation was placed upon the grant of lands. Negotiations were suspended, and the Legislature came forward with a guarantee of 5 per cent. for ten years on the estimated cost of construction. The company promoters were not satisfied, and the Government stepped in and did the work, thus laying the foundation for the extensive system of State-owned railways in Australia. It was not until April, 1856, that the seven and a half miles of track connecting Adelaide and Port Adelaide was opened as the result of an expenditure of £204,000—or over £27,000 per mile! Platelayer and bridge-builder then began work in earnest. They turned their faces northward. The first section was twenty-five miles to Gawler. That line was opened in 1857, and the little province owned at the end of that year 41½ miles of railway. The next step was to Kapunda, where copper had been discovered. The north-eastern section was available in 1860, and for many years Kapunda remained a terminus, and was greatly frequented by northern settlers when visiting the city or returning to their homes. For ten years it represented the ultima thule of the railway system, but in 1870 the copperopolis of South Australia—the Burra—then re-

garded as being in the "Far North"—was connected. The opening up of the "Northern Areas" a few years later took the "iron horse" to Crystal Brook and Port Pirie. The northward movement steadily continued until Port Augusta, 260 miles from Adelaide, was connected. The two great engineering feats in connection with railway building in South Australia were the construction of the Great Northern system, which has its terminus at Oodnadatta—the point from which it is proposed the land-grant transcontinental work

F. J. Gillen photo.
Simpson Gap, McDonnell Ranges.

should begin—and the line through the Mount Lofty Ranges, across the River Murray, and the Ninety-Mile Desert, connecting with the interstate system which now extends to Gladstone in Queensland —2,100 miles from Oodnadatta without a gap! The mountain ranges between Quorn and Port Augusta, in which is situated the bold and strikingly grand Pichi-Richi Pass—tested the skill of the engineers. Greater difficulties confronted them in finding a passage through the Mount Lofty Ranges, but they emerged from the ordeal with infinite credit to themselves; and few railways in the world better demonstrate the skill of engineer and workmen than the line which winds its way to high altitudes between Adelaide and Mount Lofty. Nine tunnels, aggregating a total length of nearly 2,000 yards, a wrought-iron skeleton-looking viaduct 620 ft. long and 107 ft. high were necessary in the first thirty miles. To cross the "Nile of Australia" a bridge consisting of five 120-ft. main spans—each containing 140 tons of ironwork—and twenty-three 60-ft. spans across a swamp had to be built.

The capital cost of the 1,229 miles of 3 ft. 6 in gauge and the 507¼ of 5 ft. 3 in. gauge is set down at £13,400,796, equal to £7,718 per mile, and about half the total public debt. The following statement has reference to the working of the railway system for the twelve months ended June 30, 1903:

	1902-3.
Passenger traffic by ordinary and season tickets	£281,666
Coaching do. other than above	60,371
Mineral do. freight	226,728
Grain do. do.	29,578
Wool do. do.	19,690
Goods do. do. other than the above	355,166
Live stock do. do.	72,360
Miscellaneous earnings	31,053
Revenue—(Gross earnings)	£1,076,612
Working expenses	£624,511
Net revenue (balance after paying working expenses)	452,101
Percentage of working expenses to revenue ... %	58.01
Do. of net revenue to capital cost (on average miles open)%	3.37
Number of passenger journeys ... No.	9,061,488
Minerals carried ... tons	546,701
Grain do. ... tons	101,602
Wool do. ... tons	14,798
Goods do. other than the above ... tons	647,066
Live stock do. ... tons	39,450
Goods and live stock, gross tonnage, freight paying	1,349,617
Train miles	3,770,351

Total earnings per train mile d.	68.53
Total working expenses per train mile ... ... d.	39.75
Total earnings per average mile open... ... ...£	620
Total working expenses per do. ... ... £	360
Locomotives ... ... No.	346
Coaching vehicles... ... ... No.	435
Goods and live stock vehicles... ... ... No.	6,021
Departmental wagons, travelling tanks, and cranes... No.	273
Population, excluding aborigines, at close of year, approximately	363,000
Miles of line open for every one thousand of population, approximately...	4.78
Population or every mile of line opened ... ... No.	209

REVENUE.
1902-1903.

Passengers—First class...	£82,776
" Second class	198,890
Mails, parcels, &c.	60,371
Minerals	226,728
Grain	29,578
Wool	19,690
Goods other than above	355,166
Live stock	72,360
Miscellaneous — Wharfage, rents, &c.	31,053
	£1,076,612

EXPENDITURE.
1902-1903.

Maintenance	£139,297
Locomotive branch...	317,217
Traffic, compensation, and general charges	167,997
	£624,511

The foregoing figures are exclusive of the Palmerston and Pine Creek Railway in the Northern Territory, also a part of the South Australian railway system and controlled from Adelaide. This line is 145 miles in length, and the mileage run last year was 30,422. The revenue was £11,298, and the expenditure £12,812.

In his last annual report the Railways Commissioner was able to write: "I record with pleasure the fact that no passenger has sustained an injury for which the department could be held responsible, and no better tribute to the general carefulness and attention to duty of the staff can be necessary."

Actuated by the very best intention—that of lessening the cost of construction—a dominant section of legislators in the seventies introduced what is known as the narrow gauge, viz., 3 ft. 6 in., as against the 5 ft. 3 in. gauge which was first established. There are three narrow systems in the State separated from one another by the broad gauge. This greatly increases the difficulty and cost of management. There are breaks from the broad to the narrow width at Hamley Bridge and Terowie north of Adelaide and at Wolseley, in the South, and in the event of a glut of traffic in the far northern, the western, or the south-eastern divisions it is not an easy matter to quickly concentrate hauling power or increase the carrying capacity at a given point. The 5 ft. 3 in. prevails between Adelaide and Melbourne, and thence as far as Albury, the border of Victoria and New South Wales. In the latter State there is one gauge—the English 4 ft. 8½ in. The question of uniformity is one that has frequently been discussed, and as often put aside because of the divergence of opinion concerning the best width to adopt and the enormous outlay involved in bringing about one common system.

An interesting feature in connection with the South Australian railways was the enterprise of this State in constructing a line to the border of New South Wales to tap the rich Barrier silver fields. The whole of the trade of Broken Hill passes over the South Australian railways. During the last year the tonnage carried amounted to 491,711 tons, giving a revenue of £339,441. Splendidly equipped workshops exist at various centres, but the main shops are at Islington, about three miles north of the city. From this establishment are turned out locomotives, carriages, and wagon stock. Some of the most powerful engines in Australia have been designed and manufactured at Islington. The Chief Mechanical Engineer, Mr. T. Roberts, in his last report, stated: "The pattern class 'F' engine, 5 ft. 3 in. gauge, for suburban passenger traffic, which was completed and issued to traffic in March, 1902, has proved to be a most successful and satisfactory engine; her average cost

being 0.71d. less per train mile than the average for the class 'P' engine doing similar duty. The pattern class 'T,' 3 ft. 6 in. gauge, tender engine, built at Islington, was completed and issued to traffic in February last, and is working very satisfactorily, hauling loads 50 per cent. in excess of the maximum load for class 'Y,' the previous standard engine.

The Ways and Works Shops, Glanville, under the control of the Engineer-in-Chief, in addition to railway work, are capable of turning out cast iron piping of various sizes for the reticulation of water. The Engineer-in-Chief, Mr. A. B. Moncrieff, in his last statement, reported that his expenditure for the twelve months ended June 30, 1903, for various works of construction being additions to the existing lines amounted to £96,385. The only railway in course of construction is a line 3½ miles long to connect the Outer Harbor, now being built. Parliament has recently sanctioned the making of a railway between Tailem Bend and Pinnaroo, a distance of eighty miles, for the purpose of opening 500,000 acres of agricultural country, and a line between Wandilo and Glencoe, nine miles in length. The former is to be the broad and the latter the narrow gauge. When these are completed there will be approximately 2,000 miles of State-owned railways in South Australia.

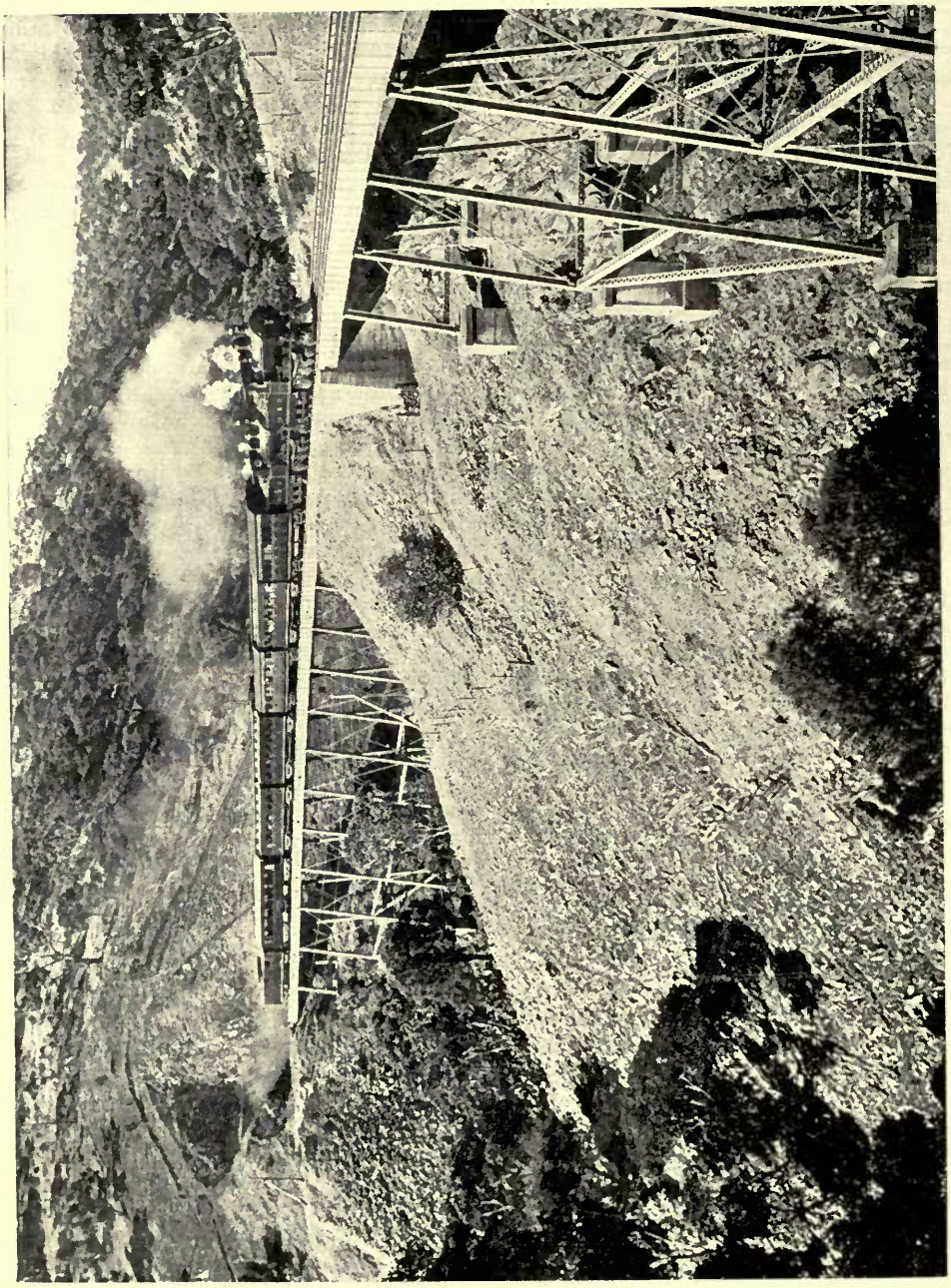
Trans-Australian Lines.

Two projects are before the public at the present time for bridging the continent with railways northwards from Oodnadatta to connect with the Pine Creek railway, and westward from Port Augusta to join the Western Australian line at the goldfields. The construction of the latter is a matter for the Federal Government, subject to the approval of the South Australian Parliament to allow the building of a railway through its territory. The cost is estimated in round figures at £5,000,000, and its advocates assert that the work would pay after a few years. It is claimed that the connecting by railway of Perth in the west with Brisbane in the east via Adelaide, Melbourne, and Sydney would be of immense benefit in the expedition of mails, and, if the occasion should arise, the transport of troops.

The proposal which finds most favor in this State is the extension of the Great Northern system of our railways. The terminus of that is at Oodnadatta, 688 miles from Adelaide, and between that point and Pine Creek there is a gap of 1,063 miles. It is claimed that it will be practicable for passengers and mails to reach Port Darwin by the Siberian railway route in fourteen days from London, or in seventeen days to Adelaide.

Tenders are now being invited by the South Australian Government for the construction of 1,063 miles of railway on the land-grant system. A bonus is offered to the contractors of a grant of land in fee-simple of 79,725,000 acres! Tenderers must deposit £10,000, and must apply by May 2, 1904. They must be prepared to —1. Construct the railway to the satisfaction of the Engineer-in-Chief, on the 3 ft. 6 in. gauge; the rails to be of steel, and of not less weight than 60 lb. to the yard. 2. Complete the work in eight years; the minimum length of line to be constructed in any one year being 100 miles. 3. Provide and always maintain a train service for goods and passengers once a week at least from each terminus, with a minimum speed of 20 miles per hour. 4. Deposit £50,000, which is to be absolutely forfeited if default is made in any of the conditions of the contract. The country through which this line would pass presents no great engineering difficulties. For the most part it is one vast plain, with here and there a sand ridge or a watercourse.

The worst gradient would be 1 in 80 for about two miles. The only difficulties between Oodnadatta and Alice Springs are a few miles of sandhills and the spanning of the Finke. From Alice Springs to Woodford Creek, 100 miles, the railway would cross high tableland country about 2,000 ft. above sea level. Then there would be a descent to Teatree Well, 1,490 ft. above sea level. The gradients for the rest of the distance would be exceedingly easy. The climate throughout the country to be tapped is excellent all the year round, and the contractors would meet with no difficulty in the matter of obtaining water and supplies of meat. Full information concerning the terms of the offer made under the Land Grant Railway Act is obtainable from the Government in Adelaide or at the Agent-General's Office, London.



Viaducts and Tunnel, Hills Railway.

PLACES WORTH VISITING SERVED BY THE SOUTH AUSTRALIAN RAILWAYS.

THE HILLS DISTRICT, THE NATIONAL PARK, AND THE SOUTH COAST WATERING PLACES.

The line over the Mount Lofty Ranges passes through beautiful scenery. Where nature undisturbed has ceased to hold sway, art and industry have stepped in, and all along the line, picturesquely dotted about on hillside and in valley, and surrounded by fruit and flower gardens, the majority of which are models of horticultural and floricultural skill and artistic arrangement, are to be found pretty residences, charming villas, and neat cottages. A pleasant day's outing in the midst of lovely surroundings may be enjoyed at any point along the line.

At **BELAIR**, 40 minutes' journey from Adelaide, is the National Park, a reserve for recreative purposes, some 2,000 acres in extent. Its exceptional natural advantages have been added to by judicious improvements, under the direction of a board of management: Miniature lakes have been formed, drives and walks laid out, bowers, shelter houses, &c., &c., erected, so that now visitors find here everything necessary for their pleasure and comfort.

After crossing the Ranges the line extends through the districts of **STRATHALBYN, BLACK SWAMP, CURRENCY CREEK,** and **FINNISS,** to the charming South Coast watering places of **GOOLWA, MIDDLETON, PORT ELLIOT,** and **VICTOR HARBOR.** The first-named is the nearest station to the **MURRAY MOUTH** and the **COORONG** (a favorite resort of sportsmen), and especially interesting as the place at which Captain Sturt, the earliest explorer, after coming down the rivers, reached the sea.

At **MIDDLETON** there is a fine stretch of shell beach.

PORT ELLIOT stands second to none in natural attractions for visitors. The never ceasing roll of the huge breakers of the Southern Ocean, the lovely spray dashing over the fine old granite boulders, and the charming little bays, providing secluded nooks for picnic parties, bears a striking resemblance to New Zealand or New South Wales coast scenery.

VICTOR HARBOR is situated a little further south on the north-west coast of Encounter Bay—the bay of islands, composed of granite boulders—and is a most picturesque place for a summer holiday. Granite Island, the nearest to the mainland, is connected with the town by a long and convenient pier, which forms a delightful promenade. The island itself has many pleasant walks and boulder-shaded nooks, where a summer day may be enjoyably passed. A tram-car runs to the island during the summer months. For geologists this is perhaps the most attractive resort on the continent, signs of glacial action being apparent on the rocks, while the country is strewn with ice-carried boulders.

At each place there are a number of commodious hotels, well-kept and replete with every comfort for visitors, also numbers of boarding-houses, where rooms or board and lodging can be obtained at prices to suit the pockets of all classes.

BOATING and **YACHTING** may be indulged in either OFF THE COAST, on the RIVER MURRAY at GOOLWA, or on the HINDMARSH RIVER, near VICTOR HARBOR. Safe fast-sailing little centre-board cutters, manned by capable men who spend their working hours sailing for profit (fishing) and their spare time sculling for pleasure, can be hired for a few hours or a week if required. At Goolwa there is also a steam launch (The Singapore) and a 10-ton schooner (The White Cloud) always available for visitors.

GOOD FISHING is obtainable ALL ROUND THE COAST, and in the MURRAY AND HINDMARSH. Schnapper, sweep, whiting, mullet, &c., in the sea, and cod, butter-fish, &c., in the river, being often very abundant. The breakers from the Southern Ocean dashing against the granite rocks are an endless attraction.

THE LAKES, CAVES, AND ROCK-BOUND COASTS OF THE SOUTH-EAST.

MOUNT GAMBIER AND ENVIRONS.—One of the principal pleasure spots in the colony is Mount Gambier, with its wonderful crater lakes, many curious caves, and English scenery. The Blue Lake, the most important of the group, is nearly a mile across from east to west. It is surrounded by rocky banks, varying from 200 feet to 30 feet in height, and the water can only be approached at two points by prepared paths. The lake varies in depth from 180 feet to 330 feet. The many beauties of the surrounding scenery, the adjoining lakes and caves, and the mountain and view therefrom, and the indigenous flora, cannot be here described; but an extended visit to this district will give holiday-seekers considerable enjoyment.

THE GLENELG RIVER.—This is one of the most beautiful streams in the southern portion of Australia. Nelson, or "The Punt," about two miles from the mouth of the river, is twenty-four miles from Mount Gambier,

and is reached by a good road the whole length. The banks of the river are in some places rugged and steep, and in others clothed to the water's edge in magnificent specimens of trees, ferns, shrubs, and wild flowers, particularly brilliant in spring and summer. The river is full of perch, bream, salmon, and trout, and duck and other wild fowl abound in large quantities.

BEACHPORT.—This excellent watering-place is reached by rail from Mount Gambier, a distance of 51 miles. The sea being broken by the bars at the entrance to the bay, the water is always comparatively smooth, and boating can be indulged in at all times. There is plenty of fishing, and also shooting on lakes George and Frome, and smaller sheets of water adjacent. The Barr-Smith steam lifeboat, City of Adelaide, is stationed at Beachport; and Penguin Island, with its lighthouse, is easily reached by water.

ROBE.—This is another favorite watering-place in the South-East, and is very prettily situated on the southern side of Guichen Bay. Its temperature in summer is said to be the coolest in the colony. It is reached from Adelaide by rail to Kingston, and thence by coach; and visitors from the metropolis are numerous during the hot months.

PORT MACDONNELL.—This watering-place is 18 miles south of Mount Gambier. The sea coast is wild and rocky, but a mile or so inland there are many secluded spots favored by picnic parties. There is a light-house at Cape Northumberland, two miles away, and the port contains public sea baths, under good management.

NARACOORTE CAVES.—The Rev. Julian Woods, F.G.S., &c., &c., after his visit to the caves, said "in point of magnitude and splendor, and in a scientific view, they do not yield in importance to such wonderful phenomena as the Adelsberg Caves, the caves in the Peak of Derbyshire, the Guarcharo Caves, and those in New South Wales and Tasmania." Alighting from the train at Naracoorte, the caves are reached after an eight-mile drive. No description can convey an adequate idea of their vastness and the natural wonders to be found there, but all travellers should visit these subterranean phenomena. A specially interesting cave, which was discovered a few years ago, has recently been opened to the public. It is near the others, and is in a perfect state of preservation, the careful oversight of the Woods and Forests Department, under whose control the caves are placed, preventing the mutilation of the beautiful stalactites with which it is studded. Application must be made to the resident forester for permission to visit this cave, a charge of 1/ being collected from each visitor. The Government has recently spent some hundreds of pounds in improving the facilities for visiting the caves. As they become better known they will rightly take their place as one of the show sights of the Australian colonies.

THE WORLD-FAMED BARRIER MINING FIELDS, AND SOME PLACES OF INTEREST NORTH OF ADELAIDE.

Rail communication between the Barrier Fields, New South Wales, the Seaboard, and Melbourne, Sydney and Brisbane, is given via the Silverton Tramway (33 miles) and the S.A. Railways (Adelaide 299 miles, and Port Pirie 219 miles.) There is a daily express (14 hours) in each direction between Adelaide and Broken Hill; sleeping cars are attached for the night journey—berth fee 7/6; and adequate refreshment-room accommodation is to be found at convenient points.

PORT AUGUSTA.—This township is within a day's journey of Adelaide, and that portion of the country between Quorn and Port Augusta, through Pichi Richi Pass, in the Flinders Range, with Mount Brown (3,200 ft. high) frequently in view, is extremely picturesque. Port Augusta is at the head of Spencer's Gulf, one of the finest waterways in Australia. The town is healthily situated, and contains many fine buildings. First-class hotel accommodation is provided, and the port offers a most enjoyable holiday to those fond of yachting and fishing.

GAWLER AND ANGASTON.—Visitors should certainly see this charming district, the home of the vine. Gawler often termed the "Modern Athens," is twenty-five miles from Adelaide, and five trains a day run to it. It is an exceedingly pretty town, situated on the banks of the South Para river, and two large iron foundries give the town a busy appearance. Eight miles east of Gawler is the Barossa Goldfield, and continuing the journey north-east through Rowland's Flat, Tanunda, and on to Angaston and Schlunke's Creek, a most fertile tract of country is passed through teeming with vineyards. The wine and brandy cellars of the Adelaide Company, known as "Chateau Tanunda," are the largest in the Australian colonies, and will well repay a visit. To reach Angaston direct passengers alight from the train at Freelong, thence coaching it. Another well-known place is the Roseworthy Argicultural College, about seven miles from Gawler. In fact, the whole of this district is interesting, the scenery beautiful, and the roads good.

CLARE.—Alighting at Saddleworth, Clare is reached by a twenty-two mile drive over to an excellent road and through delightful scenery. After passing Auburn the road thence to Clare follows the windings of the River Wakefield.

Commencing thirteen and one-half miles to the westward of Laura Railway Station, tourists may drive or cycle through Wirrabara Plantation and Forest and the Telowie Gorge, en route to Port Germein, amidst scenery both varied and picturesque. The Telowie Gorge is very fine.

Waterworks.

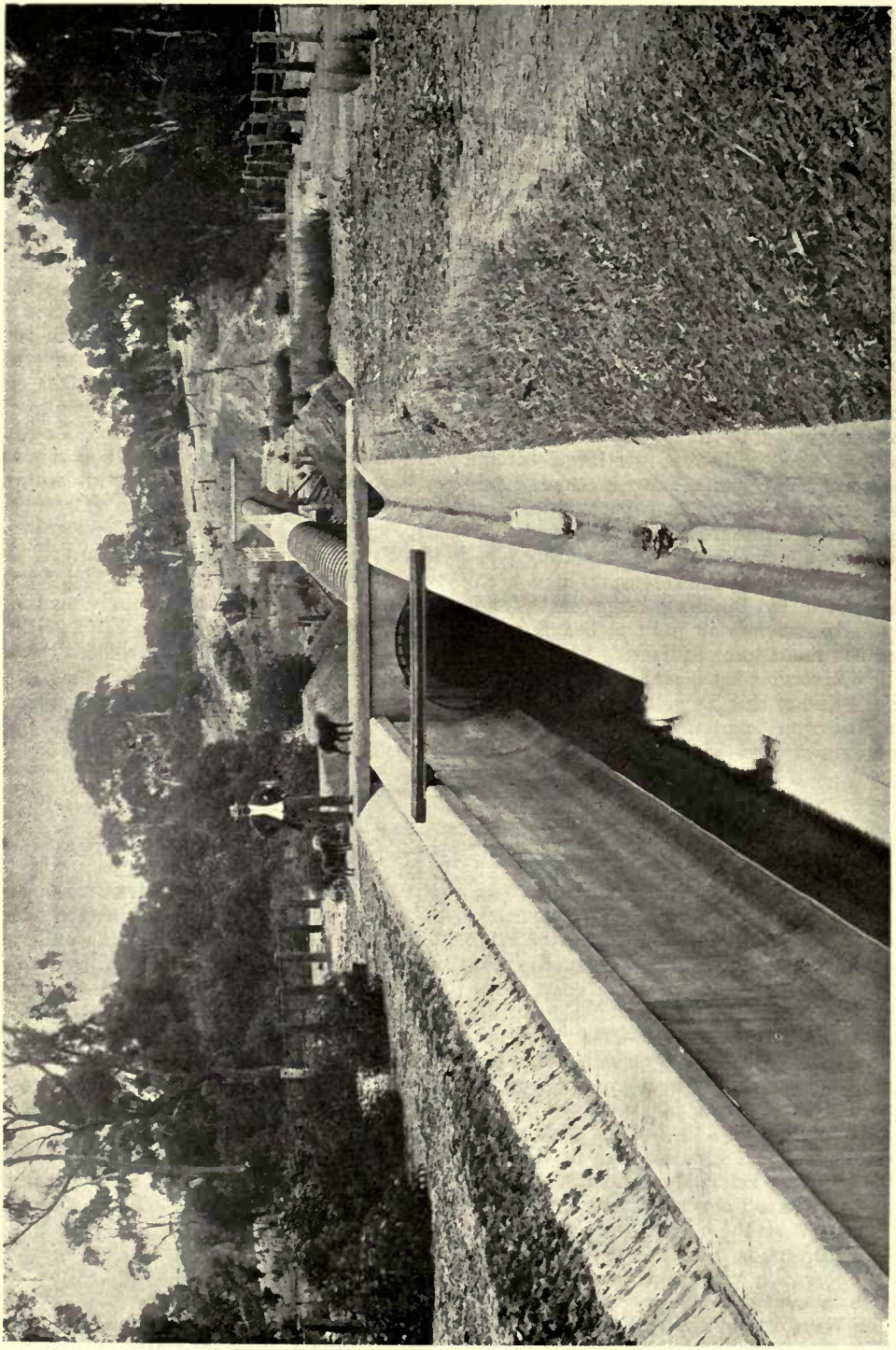
The metropolitan district and most of the large country towns are provided with an abundant supply of excellent water from waterworks constructed and controlled by the State Government. The cost of these works has been £3,668,289. The annual working expenses amount to about £31,250, and the net revenue to £81,150, thus giving a percentage of net revenue to capital cost 2.2 per cent. The chief sources of the water supply are running streams, on which weirs are constructed to divert the water, when free from flood pollution, into large storage reservoirs. Two engineering methods have been adopted in the construction of the larger storage reservoirs. Where the sites were suitable, such as those at Happy Valley and Bundaleer, the reservoirs have been constructed by building large earth and clay embankments in natural basins away from the main watercourses. The Happy Valley Reservoir has a capacity of 2,950,000 gallons, and of this, as well as of the Bundaleer Reservoir, capacity 1,319,000 gallons, some views are given. The Adelaide Waterworks, with its headworks and 634 miles of reticulation mains, cost £1,645,812. The net revenue from rates and sales of water for the year ending June 30, 1903, was £55,130, being 3.349 per cent. on the capital cost. At the Barossa Waterworks the reservoir wall has been constructed of cement concrete on the curved principle. The height of the wall is 95 ft., and the capacity of the reservoir 993,340,000 gallons. The Beetaloo Waterworks, commanding Port Pirie, Moonta, Wallaroo, Kadina, and fifteen other towns, as well as about a million acres of country lands, are unique with regard to the extent of the reticulation with cast iron pipes, of which there are no less than 637 miles, the capital cost of the works being £989,950. The aggregate capacity of the reservoirs supplying these town waterworks amounts to 7,365 million gallons, and the length of trunk and reticulation mains to 1,738 miles. The separate assessments number 79,105 of the annual value of £1,437,800.

Artesian Wells.

The State of South Australia and its "dependency," the Northern Territory, are blessed with a large share of the "great artesian basin of Australia." The intake bed of this is the western slope of the coast range from Cape York, the northernmost point in Queensland, into the north-eastern corner of New South Wales. Over this range the rainfall is exceedingly heavy, averaging 51 in. at Brisbane, 70 in. at Cooktown, 72 in. at Mackay, and 149 in. at Geraldton. These figures will give an idea of the fall in the territory referred to. On the western slope there is a large sandstone formation so porous that the rain water as it runs off the hilltops is mostly absorbed by the sandstone rocks, and the volume along the surface is considerably decreased by this loss. Were it not for this enormous absorption by the porous band no doubt the Diamentina River, Cooper's Creek, and other streams which flow southward from Queensland into South Australia would, instead of running intermittently, be strong rivers. Thus yearly a very large supply of water flows through the intake beds and passes underground to replenish the water-bearing area of the artesian basin. This annual contribution is so large that, according to an eminent authority, the comparatively small quantity discharged by the bores, however numerous they may be, will probably make no permanent difference to the subterranean storage. This is a region akin to Kubla Khan:

> In Kubla Khan a river ran,
> Through caverns measureless to man
> Down to a sunless sea.

The extent of the artesian basin is 590,000 square miles, of which Queensland



Happy Valley Waterworks.

has 380,000, South Australia 120,000, Northern Territory 30,000, and New South Wales 60,000.

In addition to the town waterworks, much attention has been given by the Government to the development of the interior by wells, reservoirs, and borings for artesian water. On such works the sum of £660,643 has been expended. The annual revenue is small, but the indirect advantages are immense. A large measure of success has resulted, particularly in the north-eastern portion of the State. There are about twenty flowing artesian wells, many of which are of great depth. The Mount Gason bore, 4,420 ft., is the deepest, and the supply is about half a million gallons per day. The water is invariably thermal, and that from the Mount Gason bore flows over the surface at a temperature of 204 deg. Fahr. It is a curious fact that the temperature increases much more rapidly in the locality of this artesian basin than in most other parts of the earth, the average mean of temperature being 1 deg. Fahr. for each 27 ft. The Coward bore, 308 ft. deep, gives a flowing 1¼ million gallons per day, and is fairly typical of the other artesian wells in the locality. Kipling declares that—

> In the Neolithic age,
> When the prehistoric springs made the piled
> Biscayan ice-packs split and shove.

Certainly, in South Australia the tapping of the great subterranean sea has completely changed the future of inland Australia. Country that was once described as "uninhabitable deserts," is now being utilised because of a plentiful supply of water; and there is a possibility of development on the lines followed by the great western districts of the United States. On the Adelaide plains and in other parts of the States sub-artesian supplies have been struck. At Virginia, about thirty miles north of the city, 24,000 gallons per day has been obtained from one bore. The following is a list of the principal Government artesian bores in South Australia:

	Feet in depth.	Gals. per diem.
Mirra Mitta...	3,534	400,000
Mungeranie	3,370	600,000
Kopperamanna	3,000	800,000
Dulkaninna...	2,226	1,000 000
Lake Crossing	1,700	200,000
Yandama	1,620	430,000
Oodnadatta...	1,571	270,000
Storm Creek	1,551	86,000
Hamilton Creek	1,417	200,000
Lake Harry	1,360	120,000
Anacoora...	1,250	700,000
Petermorra...	1,243	200 000
Strangways...	365	1,250,000
Hergott...	342	100,000
Coward...	308	1,250,000
William Creek	229	20,000
Mount Gason...	4,420	500,000
Lake Phillipson (unfi'ed)	2,232	
Goyder's Lagoon (unfi'ed)	4,440	
Coonanua	2,030	500,000
	38,208	8,626,000

The "Nile" of Australia.

Do you know the blackened timber, do you know that racing stream,
With the raw, right-angled log-jam at the end,
And the bar of sun-warmed shingle, where a man may bask and dream,
To the click of shod canoe-poles round the bend?

There is no "silent, smoky Indian" to go to—no Red-Gods "a-calling" at any point on the Murray—our greatest river, not inaptly termed sometimes "The 'Nile' of Australia." But the noble stream has many other attractions to the pleasure-seeker, and sportsman, whilst it represents to the merchant a great artery of trade with inland Australia. The Murray is the great natural drainage line of the south-eastern part of Australia. The basin of the river and its tributaries comprises 414,253 square miles, an area equal to double that of France! Altogether there are over 3,000 miles of navigable streams in the Commonwealth. The Murray is navigable for 1,750 miles, and the Darling in good seasons 1,468. About 500 miles of the navigable portion of the Murray, including the outlet to the sea, is within the borders of South Australia. This State is the natural outlet of the trade of the Darling and the Murray, and it was South Australian enterprise that first proved these streams and inaugurated a service of trading and passenger steamers. It is not surprising, therefore, that this State should protest against the action of States up-streams in constructing diversion works which would interfere with navigation. The whole question is now under consideration by State and Federal Governments, and a solution will probably be found in the building of locks and storage basins. It is estimated that a complete system of locks would cost £2,500,000, and this would be a small outlay considering the advantages from navigation and irrigation.

The Murray was first navigated by Captain Cadell in the Lady Augusta in 1853, but Captain W. R. Randell had the first steamer on the river, and closely followed Captain Cadell. The Lady Augusta completed the first voyage made on the Murray on October 14, 1853. The announcement of the arrival of the steamer at Goolwa with her cargo of 441 bales of wool, 1,000 sheepskins, and a quantity of tallow was conveyed to the Legislative Council in the following message from the Lieutenant-Governor, who had journeyed up the river with the vessel: "On board the Lady Augusta, steamer, Goolwa, October 14, 1853—Lieutenant-Governor Sir Henry Young has the gratification to announce to the Legislative Council the arrival at the Goolwa of the first river-borne wool, the produce of the vast basin of the Murray. In congratulating the Council on this auspicious commencement of the steam navigation and commerce of the great River Murray, the Lieutenant-Governor is happy to state that Captain Cadell's voyage reached to 150 miles beyond Swanhill, a distance of about 1,450 miles from the sea, and was also extended for 60 miles up the Wakool, an important branch of the Murray. The first cargo comprises wool of the Murray, the Darling, the Murrumbidgee, and the Wakool Rivers." In reply to this an address was drafted by the Select Committee of the Council, and formally adopted on October 21, 1853. It contained the following clause: "The Council requests your Excellency to cause three medals to be engraved, with suitable device and inscriptions, commemorating the auspicious opening up of the steam navigation and Commerce of the Murray, and the first arrival at the Goolwa of river-borne wool; and the Council requests that, as the Lieutenant-Governor of South Australia, whose personal exertions promoted this great enterprise, and in whose administration it originated, and has been successfully accomplished, your Excellency would be pleased to receive one of the said medals; and the Council further requests that your Excellency will be pleased to cause one of the said medals to be conferred on Captain

Francis Cadell, who completed the first commercial voyage, as owner and commander of the Lady Augusta, steamer, and Eureka, barge, with a cargo of Murray wool; and that the remaining medal may be deposited with the records of the Legislature of South Australia, under whose sanction the necessary pecuniary aid was voted in encouragement of the steam navigation of the River Murray."

There are many beauty spots in South Australia, numerous seaside and inland pleasure resorts where holiday-makers may obtain all that they require, but there are few better pleasure trips than that obtainable on Australia's great river. A steamer may be boarded at several points a few hours after leaving the city by train, and a new, ever-changing world is presented to the traveller. The snorting paddle-boat plugs her way up-stream battling pluckily against a sluggish current. The splish, splash, splish of the paddle wheels and the sharp, clear notes of the whistle, or the flash of the electric head light break into the stillness of slumbering Nature, and disturb the dreams of animals and birds. These are plentiful in the forests, which come down to the water's edge. A cliff towers high over the bows of the steamer, but the boat is skilfully turned round a right-angle bend opening out a fine long reach of shimmering water, at the end of which is another sharp corner. And so you go forward, turning, twisting, first one way and then another, as if following the track of a huge snake—heading northwards, then face on to the chilling east winds, and back again half round the compass; only there are no compasses on these river steamers. The helmsman wishes there were. It is not a compass that he wants, but clear eyes, double sets of cast iron arms to attend to the steering gear, signal the engine room, and the patience to answer the hundred and one enquiries of the bewildered but interested passengers. The steamer does a cakewalk going up the Murray. There are some river stories told to illustrate the serpentine character of the channel, and it is necessary to believe them all. A deck hand fell overboard one night, and his absence was not noticed until some hours afterwards, when he hailed the steamer many miles up stream. He had swum ashore, walked across a peninsula, and waited for the boat to come round the bend. It takes your steamer nearly all day to pass a house near Wentworth. Passengers can go ashore at the front door in the morning, engage the occupants of the house in a game of cricket, or even start a chess tournament, and join the steamer from the back door during the afternoon. The house stands on one of the many bends of this noble stream.

It is in the first flush of the dawn—when the thin grey veil of breaking day creeps over the continent—that you realise the loveliness of the scenery in the valley of the Murray, and fully appreciate the luxurious laziness of life on a river steamer. The scent of the eucalypti enters into everything, and flocks of graceful swans fly overhead. Birds of all descriptions abound on the Murray. There is the toothsome teal, the unsavoury shag, and the ungainly ibis. There are cockatoos by thousands, rosellas and grass parrots, pretty little paraquets, the minor and the swallow, the laughing jackasses, with their loud guffaws, as if they recognised you as new chums; the curlew, whose half-whistle, half-screech has a weirdness all its own in the night; the shepherd's companion, with his wagging tail and chirrupy welcome; and, of course, the magpie and the crow.

The scenery constantly changes; surprises meet the visitor at every turn of the river. It is Nature's cinematograph, and one panorama succeeds another, supplying fresh beauty spots—

> So they pass
> From stage to stage along the shining course
> Of that bright river, broadening like a sea.

The oversea visitor who wants to "see Australia" can study inland problems quicker by taking a trip on the Murray, and holiday-makers can find rest and pleasure as they steam between avenues of eucalypti and boxwood and sheoak, breathe fresh air, and look upon Nature in all its ruggedness. The River Murray, with its 1,700 miles of navigable channel, is, from a trading point of view, the "gateway of the interior." South Australia holds the key.

Finance and Trade.

The public debt of the State amounts to £25,314,440, or £70/7/5 per head of the population. Including the Northern Territory the debt is £27,828,370. The interest chargeable to South Australia in 1903 was £920,768, or £2/11/2 per head per annum, and the proportion of revenue raised by taxation £1,063,000, or £2/19/1 per head. To the European critic Australian obligations appear to be abnormally large. There is an important distinction, however, between the national debts of European countries and those of Australia. In the one case loans have disappeared in smoke, having been chiefly employed for war purposes. In these lands Government borrowings have been used for the construction of railways, waterworks, telegraphs, harbors, and in other revenue-earning services. If offered for sale the works representing the public debt would bring several times over the amount borrowed for their construction. In his last Budget address in August the Treasurer (Hon. R. Butler) said: "In almost every instance the figures are an improvement on those of last year. We have £20,203,792 earning 2.89 per cent. interest, or nearly 3 per cent., out of a total debt of about £27,000,000. Railways earned 3.33 per cent., against 2.98 per cent. last year; waterworks, 1.85 per cent., against 1.77; sewers, 4.11 per cent., against 3.49; jetties and lighthouses, 1.33 per cent., against 1.86, a decrease in the shipping accounting for that drop; improvements on pastoral leases, 1.31 per cent., against 1.02; and land repurchase and working men's blocks, 4.1 per cent., against 3.37. It works out this way. Out of a total annual interest payment of £913,829, we receive directly from the lines I have quoted £587,870, so that we have to make up from the general revenue £325,959. For what? For roads which we have made, and which are a credit to the State, amounting to nearly £1,500,000; defences, 254,000; drainage, £273,000; and harbor improvements, £1,114,000, which indirectly must be considered one of the most valuable heads of expenditure because they enable shipping to come here and increase the trade of the country. School buildings and other works have also to be reckoned." Over £20,000,000 of the public debt is represented by revenue-earning public works. Taxation per head of the population in 1902 was: South Australia, £2/19/1½; New South Wales, £3 6/; Victoria, £2/17/3; Queensland, £3 5/9½; and Western Australia, £7/10/4. The following shows the gross revenue and expenditure during the last six years:

	Revenue.	Expenditure.
1898	£2,566,611	£2,598,939
1899	2,665,477	2,632,840
1900	2,780,858	2,779,317
1901	2,824,212	2,846,577
1902	2,428,560	2,650,875
1903	2,483,095	2,482,919

There are seven Banks doing business in the State, not including the Savings and the State Banks. The Bank of Adelaide is the only local financial establishment; and ever since it opened its doors for business it has had a remarkably successful career. The other institutions are the Union, National, English, Scottish, and Australian, Commercial, New South Wales, and Bank of Australasia. For 1902 the total "notes in circulation" amounted to £361,372; bills in circulation, £12,179; and deposits, £5,926,113. The "total average liabilities" amounted to £6,334,007; the "coined gold, silver, and other metals," "bullion," and "Government securities" held totalled £1,652,936; "advances" amounted to £4,262,899; "total average assets" stood at £6,481,037. Interest on fixed deposit remained unaltered at 3 per cent. per annum.

The Savings Bank of South Australia first opened its doors for business on March 11, 1848. There are now 155 suburban and country branches. In 1887 eighteen persons in every hundred were depositors, while in 1903 the number had increased to thirty-seven in every hundred. The expenses of management, which were 12/8¾ per £1,000 of total funds in 1887 have

gradually decreased to 6/5 in 1903. The number of depositors in 1902 was 116,436, and the amount deposited £1,985,689, bearing 3 per cent. interest. The reserve fund stood at £131,000, and total funds £4,147,178. The amount on mortgage was £1,397,869, bearing 4 per cent. interest. During last session of Parliament legislation was passed to facilitate the Bank extending its operations, and to provide for the payment of the trustees. The board now consists of Mr. W. H. Phillipps (Chairman), Sir E. T. Smith, Hon. J. V. O'Loghlin, and Messrs. H. Adams, W. G. Coombs, and J. R. Corpe. The manager is Mr. W. B. Poole, and the accountant Mr. H. M. Mudie.

The State Bank was established by the State Advances Act of 1895, under which it was authorised to lend to producers to the extent of three-fifths of the value of their properties as determined by the Bank's valuators. Advances were also authorised to be made on Crown lands, and by a subsequent Act power was given to make advances on any freehold property irrespective of whether the borrower was a producer or not. Subsequently the legislation regarding loans on Crown lands was liberalised. The Bank is not permitted to lend more than £5,000 to any one person, nor must advances current at any one period exceed three million pounds. Money is raised by the issue of mortgage bonds, payment of interest and principal being guaranteed by the Government, and these bonds are redeemable by ballot after five years' currency. The Bank also has power to purchase mortgage bonds instead of balloting for their redemption; and up to the present time bonds to the amount of £232,000 have been so repurchased. The maximum rate of interest allowed to be charged to borrowers is 5 per cent. per annum, and the maximum currency of a loan is forty-two years. All loans are repaid by equal half-yearly instalments, which include interest at the rate agreed upon, hitherto 4½ per cent., and a portion of the principal. Borrowers have the right at any time to make repayment of principal in excess of the amount included in the instalment, or they may repay the whole advance. In cases where excess payments are made a corresponding reduction of interest is allowed by the Bank. The following table will show at a glance the operations of the State Bank from its inception up to the date of the last balance-sheet, March 31, 1903:

ADVANCES AND REPAYMENTS SINCE THE STATE BANK'S INCEPTION IN MARCH, 1896.

Period.	Advances	Repaid	Balance.
Five months—			
June, 1896 ...	£30,425	£2	£30,423
One year—			
June, 1897 ...	231,595	2 007	229,588
Nine months—			
March, 1898	110,500	9,709	100,791
One year—			
March, 1899	91,632	32,137	59,494
One year—			
March, 1900	65,729	31,474	34,255
One year—			
March, 1901	90,824	37,967	52,857
One year—			
March, 1902	92,023	62,525	29,497
One year—			
March, 1903	81,280	56,441	24,840
Total ...	794,008	232,262	561,745

The reserve fund acquired by premiums on the sale of mortgage bonds amounts to £6,097, added to which the difference between the rate at which the Bank has borrowed and the rate charged to borrowers, £6,404, gives a total reserve of £12 501. The working expenses on the total funds amount to 10/11 per cent. During the early history of the Bank, owing to the absence of capital, and some time being required for the institution to get into working order, the cost of management was necessarily in excess of the profit. This deficiency, however, only applies to the first two years, whilst during the last three years the profits have amounted to £1,723 in 1901, £2,011 in 1902, and for the twelve months ending March 31, 1903, £2,730. It is expected that the current year's operations will produce a profit of not less than £3,000. The Bank is managed by a paid board of five members appointed by the Government. The present trustees are Messrs. G. Inglis (Chairman), George Fuller, A. M. Simpson, E. W. Krichauff, and H. D. Gell. The chief executive officer of the Bank is the Inspector-General (Mr.

G. S. Wright), and the Accountant (Mr. M. F. McNamara). The accounts of the Bank are audited by two auditors appointed by the board, subject to the approval of the Treasurer, whilst the Commissioner of Audit also examines the accounts and makes an annual report on the Bank to Parliament. The Bank prepares all its own mortgages free of cost to the borrower.

Trade statistics have already been dealt with in reviewing the expansion of various industries. It is only necessary to restate some of the leading items and to give a summarised form an idea of the extent and direction of South Australian trade.

The value of the wool sent away from this State exceeds a million sterling each year. The following statistics show the importance of the wool trade and the growing popularity of the local wool sales:

	S.A Exports. Bales.	Adelaide Sales. Bales	Per cent. Sales to Exports.
1894-5 ...	173,189	64,056	37.
1895-6 ...	179,576	80,234	44.
1896-7 ...	153,751	63,804	41.
1897-8 ...	116,592	51,287	43.
1898-9 ...	113,056	61,122	54.
1899-1900	119,766	70,682	58.
1900-1 ...	115,774	42,637	37.
1901-2 ...	111,676	65,239	58.
1902-3 ...	96,524	61,215	63.

The declared value of wool shipments from South Australia during the last five years have been: 1898, £945,589; 1899, £1,511,693; 1900, £1,003,391; 1901, £1,029,063; and 1902, £1,222,403. The bulk of our wool is shipped to the United Kingdom. France and Germany are the next largest direct importers.

Pursuits of the People.

The following statement of the number of persons engaged in agricultural, pastoral, and other productive pursuits in South Australia is taken from the last census—1901. Total population, 362,604; total breadwinners, 153,296:

Classification of Occupation.	Persons	Percentage of Population.	Percentage of Breadwinners.
Primary Producers—			
Agricultural pursuits	34,186	9.43	22.30
Pastoral pursuits	7,061	1.96	4.61
Mining	6,301	1.74	4.11
Other primary producers	1,613	.44	1.05
Total...	49,161	13.57	32.07
Industrial—			
Manufacturing ...	24,924	6.87	16.26
Building and construction ...	8,836	2.44	5.76
Indefinite	7,473	2.06	4.88
Total...	41,233	11.37	26.90

TOTAL IMPORT AND EXPORT TRADE, AND BALANCE OF TRADE, &C., OF SOUTH AUSTRALIA, 1893-1902.

Year.	Total Import and Export Trade.	Total Imports.	Imports retained for Home Consumption.	Imports Re-Exported.	Total Exports.	Exports Produce of the State.	Balance S.A. Produce Exported over Imports Consumed.	Balance Imports Consumed over S.A. Produce Exported.
	£	£	£	£	£	£	£	£
1893	16 398,136	7,934,200	2,765,739	5,168,461	8,463 936	3,295,475	529 736	—
1894	13,528,464	6,226,690	2,272 380	3.954,310	7,301,774	3,447.464	1.075,084	—
1895	12,762,639	5.585,601	1,946,314	3,639.287	7.177,038	3,537.751	1.591,437	—
1896	14.754,824	7.160.770	2 836,328	4,324.442	7,594 054	3 269.612	433 284	—
1897	14,054,800	7,126,385	2,682.110	4,444.275	6.928 415	2,484 140	—	197,970
1898	12,980,579	6,184,805	1 876,040	4,308,765	6,795.774	2 487.009	610,969	—
1899	15,272,754	6,884 358	2 441,007	4,443,351	8,388,396	3 945,045	1,505,038	—
1900	16,063,709	8.034,552	3,615 912	4 418,640	8 029 157	3 610 517	—	5,395
1901	15,387.477	7.371,588	3 572 300	3,799,288	8 015,889	4 216 601	644 301	—
1902	13,772,296	6,073,782	3,144,215	2.929,567	7,698,514	4.768.947	1,624 732	—

VALUE OF IMPORTS FROM DIFFERENT COUNTRIES.

From—	1893. £	1898. £	1902. £
Other Australian States	5,174,861	3,329,851	2,948,688
United Kingdom	1,925,985	1,974,818	1,901,996
Foreign countries	644,835	667,536	969,245

VALUE OF EXPORTS TO DIFFERENT COUNTRIES.

To—	1893. £	1898. £	1902. £
Other Australian States	3,555,888	3,308,416	3,967,897
United Kingdom	3,477,579	2,306,202	1,911,116
Foreign countries	411,444	591,819	904,682

Sixty Years of Progress.

Few records of progress are more striking than those that can be put forward to demonstrate the substantial expansion which has taken place in South Australia during the sixty years of its industrial history, 1842-1902. The following figures speak volumes for the pluck, endurance, and enterprise of a people who have had an enormous territory to develop:

	1842.	1872	1902.
Population	16,000	192,223	362,000
Land in cultivation (acres)	18,940	1,164,846	3,137,175
Sheep (number of)	300,000	4,900,687	5,012,216
Cattle (number of)	26,000	151,662	213,343
Horses (number of)	1,560	82,215	164,625
Revenue (£)	23,404	697,422	2,428,560
Expenditure (£)	68,434	700,255	2,650,875
Imports (£)	147,349	2,801,571	6,073,782
Exports (£)	75,248	3,738,623	7,698,514
Staple produce exported (£)	29,070	3,542,087	4,768,947
Railways open (miles)	—	133	1,736¼
Telegraphs (miles)	—	3,731	20,000
Shipping (tonnage)	25,354	347,360	3,959,352
Public schools (number of)	—	307	716

Adelaide: the Capital of S.A.

Viewed from any aspect, Adelaide is a beautiful city. The visitor from over the seas picks up the skyline of the Mount Lofty ranges soon after the steamer enters the quieter waters of St. Vincent's Gulf through Investigator Straits. The dark hills stand out against the background of pale blue sky and present kaleidoscopic changes which hold the attention. Mount Lofty, the highest peak, is 2,400 feet above sea level. It forms a prominent landmark for the mariner, and proves a source of delightful speculation to the stranger, who cannot fail to be charmed with the panoramic view gradually unfolded. From the highest point a tapering, jagged line of hills take the form of a half crescent curving southwards towards the sea and northwards until lost to view in banks of fleecy clouds. The coastline of Yorke's Peninsula which may be seen on the port bow shortly after entering narrow waters is lost to view as the anchorage on the eastern shore of the gulf is approached. The lowlands between the ranges and the sea—the rich and fruitful plains, by which the capital city is bounded, stretching north and south for many miles—come under observation.

The tourist from the deck of his steamer lying in the roadstead cannot fail to be deeply impressed with the magnificent scene spread out before him. The ranges, running nearly north and south, shut off the eastern view and concentrate attention to the plains to which the hills form so imposing a background. The country between is open and undulating, rising in easy gradients from the sea shore, with here and there a dome-shaped hill emphasising some feature of interest—an outpost of the metropolis, or perhaps a vineyard—a clump of gum-trees or newly-ploughed land providing a mellow brown tint to the landscape. The cultivated fields give the country a chess board appearance, vineyards alternating with wheat or lucerne crops; grass lands contrasting with recently turned soil of varying colors. Close at hand is a fine esplanade connecting Largs Bay and the Semaphore—two leading watering places. The stranger who looks with critical eyes at the dwelling houses near the sea is satisfied with the taste displayed in the architecture, while the substantial character of the buildings cannot fail to please. Were he able to extend his view a few miles along the coast to the south and note the residential mansions which cluster near the spot where the pioneers of sixty-seven years ago were carried on shore on the backs of sailors, astonishment would be added to his admiration of the beauty of the picture now growing upon him. Substantial facts of the great progress made in this new land, of existing prosperity and present-day activity, rapidly multiply as details of the panorama are noted. Tall chimney stacks belching forth smoke suggest a busy manufacturing centre. The City of Port Adelaide—for it is the chief seaport of the State that catches the eye—is situated on an inlet of the sea up which any vessel that can pass through the Suez Canal may be safely navigated. The Orient liner, Ophir, on the occasion of the visit of the Prince and Princess of Wales, berthed alongside a wharf at Port Adelaide where, sixty years ago, vessels of 200 tons got stuck in the mud and the mangroves. Between the chief seaport and the metropolis are a number of important manufacturing industries; but, carrying his vision beyond tall masts of ships in harbor and chimney stacks of silver and copper smelting works and factories, the newcomer picks out the city and feasts his eyes on the many evidences of beauty which even this telescopic inspection of Adelaide provides. He has not yet seen the wide streets, flanked by handsome buildings, which intersect at right angles. Nor can that belt of trees which encircle the four-terraced city be fully appreciated from such a distance. The observing tourist notes, however, the elevated position that supplies so fine a natural drainage, and he is forced to the conclusion that for beauty

of situation Adelaide is a well-favored city. A close inspection cannot fail to confirm such an opinion. A fertile plain, bounded to the south and east by a circling range of softly rounded hills, parted by a succession of verdant valleys; on the west by the blue waters of the Gulf of St. Vincent breaking upon long reaches of sandy beach; and on the north, stretching away in gentle undulations as far as the eye can reach—such is the site of Adelaide. Beautiful for situation, admirably laid out, compact in itself, with ample streets, well-planted squares, and handsome buildings, a forest of spires and towers visible from afar, it rejoices in the possession of noble pleasure grounds. Dr. Parkin, the representative of the trustees of the late Cecil Rhodes, remarked during his speech to the Adelaide University students on a recent occasion that, speaking in all sincerity, and with no desire to flatter, he considered Adelaide one of the most beautiful and one of the most highly favored cities he had seen in the course of his travels through America and round the British Empire. He referred to its lovely circle of hills, its broad belt of park lands, its splendid educational institutions, its charming Botanical Gardens, to the liberality of its wealthy citizens, and to the native intelligence of its people. Residents of Adelaide, he said, might travel all over the world without finding any reason to lose their admiration for their own home. They were "citizens of no mean city," and they could without difficulty, if they proceeded in the future as they had done in the past, make Adelaide "the Athens of Australia."

The present necessity of having to board a small launch in order to reach shore will shortly be removed, as a commodious harbor is in course of construction at a cost of about £500,000, not far from where the mail steamers anchor. A train journey of half an hour through the leading sea-town will then bring the traveller to the capital of the State. The more he becomes acquainted with the chief town of South Australia, its suburbs, and the surrounding country, the greater will be the admiration of the critical visitor. He will find much to appreciate—such as wide, clean streets, fine buildings, a perfect system of drainage, and an absence of that seamy side of city life so noticeable in many metropolitan centres. Such ancient means of locomotion as our horse tramcars will occasion amusement—perhaps pity that such a blot should exist—but this is a weak spot which it is hoped will shortly be removed. Negotiations are at present proceeding for giving Adelaide a modern system of electric tramways.

Adelaide has long since been conceded the title of the Queen City of the South. One has only to look around to realise that its municipal guardians are determined to retain that proud distinction for the capital. Antiquity is no doubt a fine thing from many points of view, but it certainly does not produce the best results when applied to the general modelling and the conveniences of a busy centre. The great majority of the municipal services to be found within Adelaide's four-mile-long terraces are distinctly on the modern side, while perhaps no city was ever laid out with greater foresight than that shown by Colonel Light. Much-travelled visitors are never tired of praising the "cleanliness and brightness of the streets," "the picture of simple Arcadian beauty presented by the park lands." It has been said by a recent visitor that Adelaide "presents an aspect of substantial comfort and solid opulence which is not equalled by some English cities counting as many generations of existence as Adelaide does years." The park lands of Adelaide are its glory, and that is the first fact to be recognised by 99 out of every 100 visitors who come from the great builded brickeries of the old world. They are popularly termed the "lungs of the city" and "the people's playground," and the aptness of the appellations may be gathered from the fact that fully 150 athletic clubs of various descriptions hold permits to carry on their games in these reserves. One of the most energetic committees into which members of the Corporation divide themselves is that which directs operations in the parks and squares and plantations. The beautifying of Adelaide is very dear to the heart of every member of that committee, and each year sees something accomplished, something done in the arboriculture for which the people, the land, the climate, and the conditions of the country generally cry out. There has been misdirection in the long past.

Some kinds of trees were planted which are now an eyesore, and cannot be spared by the municipal woodman. Others have not flourished because they have been put down in unfriendly soil. These are handicaps which are being to a large extent overcome. Mr. Peter Barr, the "Daffodil King," said:—"I am charmed with your squares and reserves, and am astonished to find that no effort is made to exclude dogs, and that the reserves are not closed at night time. In no other city in Australasia where the public have such free access have they such excellent results to show as are presented by the municipal gardens of Adelaide." Mr. Barr was then referring solely to the accomplishments of the Corporation, and not to the triumphs in arboricultural enterprise which are to be seen in the Botanic Gardens and the Botanic Park, which come right within the town bounds. The walk down the city road, with its avenue of even plane trees, its velvety and expansive lawns on either side, its well-tended shrubbery, and its rotunda, the gift of the late Sir Thos. Elder, overlooking the Torrens Lake, the creation of a former Mayor (Sir E. T. Smith), is one of the finest examples of municipally-created scenery to be found in the Southern Hemisphere. The green slopes of the banks forming the Torrens Lake are a favorite resort of citizens during the summer evenings. They rest on the well-kept lawns and listen to open-air concerts conducted in the Rotunda at the cost of the municipality. Another spot which has helped to make the name of Adelaide fragrant is the approach to the Zoological Gardens on Frome-road, but there are dozens of other specimens of artificial rurality which contribute to the general beauty of the city. They need not be catalogued. They require to be seen. Here and there the outlook is relieved by statuary, the gifts of generous citizens. Victoria-square claims two magnificent bronzes representing the late Queen Victoria and the Farnese Hercules, while arrangements have been made for setting up in the same locality a statue of John McDouall Stuart, the first explorer to cross the Australian continent. A magnificent monument in memory of South Australians who died for King and Country in South Africa will shortly grace the space in front of Government House. Figures of Venus, Robert Burns, and Sir Thomas Elder adorn North-terrace, where national buildings, combined with municipal enterprise and substantial evidences of public-spirited philanthropy, make up one of the most picturesque boulevards in the Commonwealth.

The width of the streets is another feature of the city which has received commendation second only to its high tone generally and that cleanliness for which Adelaide is justly celebrated. The site so wisely chosen by Colonel Light lent itself to the adoption of an admirable deep drainage system, and the capital of South Australia enjoys about the lowest death rate in the world.

Turning to the historical side, it is interesting to note that Adelaide is the birthplace of municipal Government in Australia. In the latter part of 1839 the first municipal law was passed in South Australia, but it was not until October 31, 1840, that the principles of self-Government were practically adopted by the election of a Mayor and Common Council, consisting of 19 members. The first Chief Magistrate was Mr. J. H. (afterwards Sir Jas. Hurtle) Fisher, and he has had 25 successors. Mr. G. S. (afterwards Sir Geo. Strickland) Kingston filled the post of first Town Surveyor and Collector, and Mr. John Morphett was the first City Treasurer, the last-named receiving the princely salary of £1 a week. The law which called into being this local authority was a partial transcript of the English Statute of 1835, although modified to some extent to meet the new conditions of a people who only four years earlier had landed in an unknown country. Melbourne and Sydney followed South Australia's lead two years later. From a village of dug-outs, tents, and pine and reed huts, Adelaide soon began to put on the outward garb of a progressive city. In the first year the property within its bounds was valued for assessment purposes at £60,000. So rapidly did the price of land rise that within five years of the colonization of South Australia the capital value of the city site was estimated at £300,000. The latest published figures gives the value of the city estate for

assessment purposes as £441,400. The whole of the acres sold in Adelaide, with the exception of the squares and reserves, realised less than £4,000. The population of the city in 1840 was 8,480, and within the Corporation bounds to-day there are nearly 40,000 people resident, while the whole of the metropolitan area, including the suburbs, claims over 163,000 souls. At the close of 1903 the bonded debt will be £63,900, against which the Corporation has assets in freeholds, buildings, and plant amounting to £214,164. Even when it had become a full-blown Corporation Adelaide did not always possess the same attractive appearance which its fine broad streets now present. When the Town Council was two years old the roadways were in such a disgraceful condition that bullock drays took possession of the footpaths and pedestrians were forced on to the roads. This State of affairs continued for some years, owing largely to the misdirected application of a large proportion of the rates, and many of the roads were repaired with funds privately subscribed. Much money was thrown away in the building and re-building of unsubstantial bridges over the Torrens—a river which from time immemorial has been a source of great vexation to the municipal authorities. In spite of many discouragements, the improvement of the city was systematically undertaken, and to the present day the spirit of progression has actuated the elect of the ratepayers.

Bold and expensive but necessary works were taken in hand in the earlier days. The Torrens was at last effectively spanned in three places, the Victoria Bridge, opposite to the end of Morphett-street, costing £11,317; the Adelaide Bridge on King William-road, £11,050, and the Albert Bridge, Frome-road, £8,348. An Act of Parliament authorised the Corporation to borrow £20,000 for the erection of a Town Hall and municipal offices, and in June, 1866, a stately pile of buildings was opened. The first meeting of the Corporation took place in a rented room in Hindley-street. Cattle yards were constructed at a cost of £5,000, and the Torrens Lake was created by the erection of a weir at an expense of £11,766, while nearly £10,000 was spent in fencing in five beautiful squares. Another £7,000 went in the erection of public baths, while expenditure on markets of various descriptions practically knew no limits for a time. The Government undertook the water and drainage services, while the lighting by gas and electricity have always been in the hands of private companies. Few modern cities, indeed, have given more encouragement and scope to private enterprise, and what is the result of this happy combination with municipal effort? A writer in the "Saturday Review" speaks of Adelaide as "a model city," and adds: "There is in it something wholly impossible to define; a combination it may be of the sunshine, the dark trees, the low houses, and an all-pervading look of cleanliness and freshness in which Adelaide stands alone." The present Mayor of Adelaide is the Right Worshipful Lewis Cohen, M.P., who held the same office some years ago. Mr. Cohen is one of the most popular Mayors the city has had, and is holding office at the present time for the third successive year. The Jubilee of the Corporation was celebrated in 1890, and eight years later Adelaide lost its veteran Town Clerk, Mr. Thos. Worsnop, who for nearly 30 years held executive sway. His name deserves a high place in Australian municipal history. The city has had seven Town Clerks in the past 63 years, the occupants of the office having been:—1840-1843, D. Spence; 1849-1852, E. S. Webber; 1852-1856, W. T. Sabben; 1856-1869, W. A. Hughes; 1869-1898, T. Worsnop,; 1898-1899, A. Wright; May, 1899, T. George Ellery, who now holds office. Without doubt the last-named is one of the most able and enterprising Town Clerks in Australasia, an accepted authority on all municipal questions, and an officer possessing the complete confidence of his Council and the citizens.

Within the confines of the City of Adelaide there are 90 miles of streets, and 13 miles of roads through the park lands. There are 170 miles of footpaths in the city, and 27 miles of promenades in the park lands, which comprise 2,300 acres. The valuation of the city estate amounts to £264,000, but in the course of a few

years quite a number of valuable properties will fall into the hands of the Corporation.

Few of the present generation stop to enquire the origin of the names which find a place on Adelaide's municipal map, and yet, when one comes to investigate the subject, it is found to be of engrossing interest. The names of the leading pioneers are perpetuated all over the city throughout which the personal element in the nomenclature is specially marked. King William-street was named after King William IV., the reigning monarch at the time of the proclamation of S.A.; Rundle-street after John Rundle, one of the Commissioners for South Australia; Hindley-street after C. Hindley, M.P., another Commissioner; Grenfell-street, after Pascoe Grenfell, M.P., anti-slavery advocate and father of Sir Francis Grenfell, a general in the British Army; Carrington-street after Lord Carrington; Halifax-street after Mr. Hallifax, of Glen and Co., one of the founders of the province, whose name was wrongly spelt on the original plan; Gilbert-street after Thomas Gilbert, the comptroller of stores; Gilles-street after Osmond Gilles, first Colonial Treasurer; Gouger-street after Robert Gouger, and Grote-street after George Grote, M.P., both Commissioners of South Australia; Hill-street after Sir Rowland Hill, British Postmaster-General; Morphett-street after Sir John Morphett; Pirie-street after Sir John Pirie, Alderman of the City of London; Pulteney-street after Sir Pulteney Malcolm, Admiral; Waymouth-street after Henry Waymouth; and Wakefield-street after Edward Gibbon Wakefield, the distinguished coloniser. Explorers by land and sea are honored in the street nomenclature—Captain Matthew Flinders, Sir John Franklin, and Captain Sturt, who discovered the River Murray. Angas-street is after George Fife Angas, father of the province, to whose memory a silent toast is drunk every Commemoration Day at Glenelg; Currie-street after the Hon. Raikes Currie; Hanson-street after Sir Richard Davies Hanson, a distinguished member of the Literary Society of London and secretary to the Governor of Canada; and Hutt-street after Sir William Hutt. In North Adelaide we are reminded of Lord Brougham, Daniel O'Connell, and Sir Fowell Buxton, father of an ex-Governor of South Australia. Jeffcott-street perpetuates the name of Sir J. W. Jeffcott, the State's first Judge, who was drowned at the mouth of the Murray; Kermode-street after Robert Quayle Kermode, whose daughter was engaged to be married to the Judge; and Melbourne-street after Lord Melbourne, a Prime Minister of England. The illustrious individuals after whom the five squares were named were, at the time—Princess Victoria, heir apparent to the throne, Colonel Light, Governor Hindmarsh, W. Woolyche Whitmore, M.P., Colonization Commissioner, Sir James Hurtle Fisher, and the Duke of Wellington, under whom Colonel Light had served in the Peninsular War, and by whom the latter was recommended the first Surveyor-General of South Australia.

Education.

Whether or not the system of education in South Australia realises Huxley's ideal —"a great educational ladder with one end in the gutter and the other in the University"—experts agree that it represents a gradation in regular steps towards "practical education" not excelled in any part of the world. A remarkable evolution in educational methods has been witnessed in this State since the passing of the first legislation on the subject in 1847; and the movement has been in the direction of a scientific development of mind and body. During the pioneer days there were no public schools, and little attention was devoted to the training of the young. Towards the end of the forties a capitation grant was paid out of State funds to the few private schools then in existence, but the plan did not work well. "The pilgrim fathers" had no toleration for anything that looked like "State aid to religion." Five years later the Government assumed direct control of primary education, and early in 1852 a Central Board of Education was created—(1) To establish schools, or recognise such schools as were already in existence, in which good secular instruction, based on Christian principles, but free from sectarian difference of belief or opinion, should be imparted. (2) To grant licences to teachers, and to pay them out of State revenues salaries ranging from £40 to £100 per annum in augmentation of the fees paid by the parents of the children. (3) To appoint inspectors, who should visit the schools and make reports on the character of the instruction given to the Central Board; and (4) To recommend the Colonial Government to give grants in aid of buildings erected by local subscriptions, up to an amount not exceeding £200 per school. The next important step was taken in 1875, when the management of the public schools was given to a Council of Education under the presidency of a paid officer. A wise choice was made in selecting for this responsible post Mr. John Anderson Hartley, B.A., B.Sc. (Lond.), at that time headmaster of Prince Alfred College. Mr. Hartley is regarded as having been the father of the educational system of South Australia.— For over 20 years he controlled the destinies of the department, exercising a noble influence on the child-life of the State. A man of great culture, Mr. Hartley possessed exceptional powers of organization and administration, high ideals, and a splendid enthusiasm that were infectious. It has been well said by one of his colleagues that "it is to the genius of this officer, and the love of their work which he was able to create and sustain in all his subordinates that the colonists of South Australia are mainly indebted for their excellent State schools and school publications to-day." A national loss was sustained in the death of Mr. Hartley, which occurred in 1896 as the result of an accident.

The Council of Education was superseded by direct management with Mr. Hartley as Inspector-General, in January, 1878, and on his death the control was vested in a "Board of Inspectors," consisting of Messrs. L. W. Stanton (Chairman), Thomas Burgan, and C. L. Whitham. In July, 1902, the Board was abolished, and an Inspector-General again appointed (Mr. L. W. Stanton). He, assisted by an able staff of inspectors and teachers, has charge of no less than 716 State schools, with a roll call of 57,973 children.

Prior to 1891 the State system of primary education was known as a secular and compulsory system, but not free. The Act of 1875 was, however, further amended in 1891, and as from January, 1892, this Act provided that "no fee shall be payable by any parent to the minister, or to any teacher of a public school established under the provisions of the Education Act, 1875, for the education of any child in any such school." This Act further provided that in the case of children between the age of nine and thirteen years the compulsory distance should be increased from two to three miles. To satisfy the compulsory requirements of the Act each child in the

State between the ages of seven and thirteen years, residing within the compulsory radius, must attend an efficient school for at least thirty-five days each quarter.

The curriculum is of an elastic character to permit of some display of individuality on the part of teachers. The regulations fix the course of instruction, but while the main line of subjects is defined in order to secure uniformity of work in all grades of primary schools, variation is permitted under the approval of the district inspectors. Head teachers also exercise discretion within the limits of the general organization, but greater freedom is allowed in the teaching of such subjects as elementary science, horticulture, agriculture, and other various kinds of manual work. The main principles which give tone to the whole system of State education are thus officially defined:—"That the child should be led by carefully graded steps, from the known into the region of the unknown; from the particular to the general; from the concrete to the abstract, and from the microcosm of the school to the macrocosm of the universe."

Considerable attention is devoted to physical culture. Drilling, manual exercise, and swimming are part of the curriculum. To the accompaniment of their own drum and fife bands the State school children can "march past" or engage in military manœuvring with the accuracy and precision of well trained soldiers. In the larger school girls are taught to cook and sew, whilst the boys are encouraged in the lower branches of manual work.

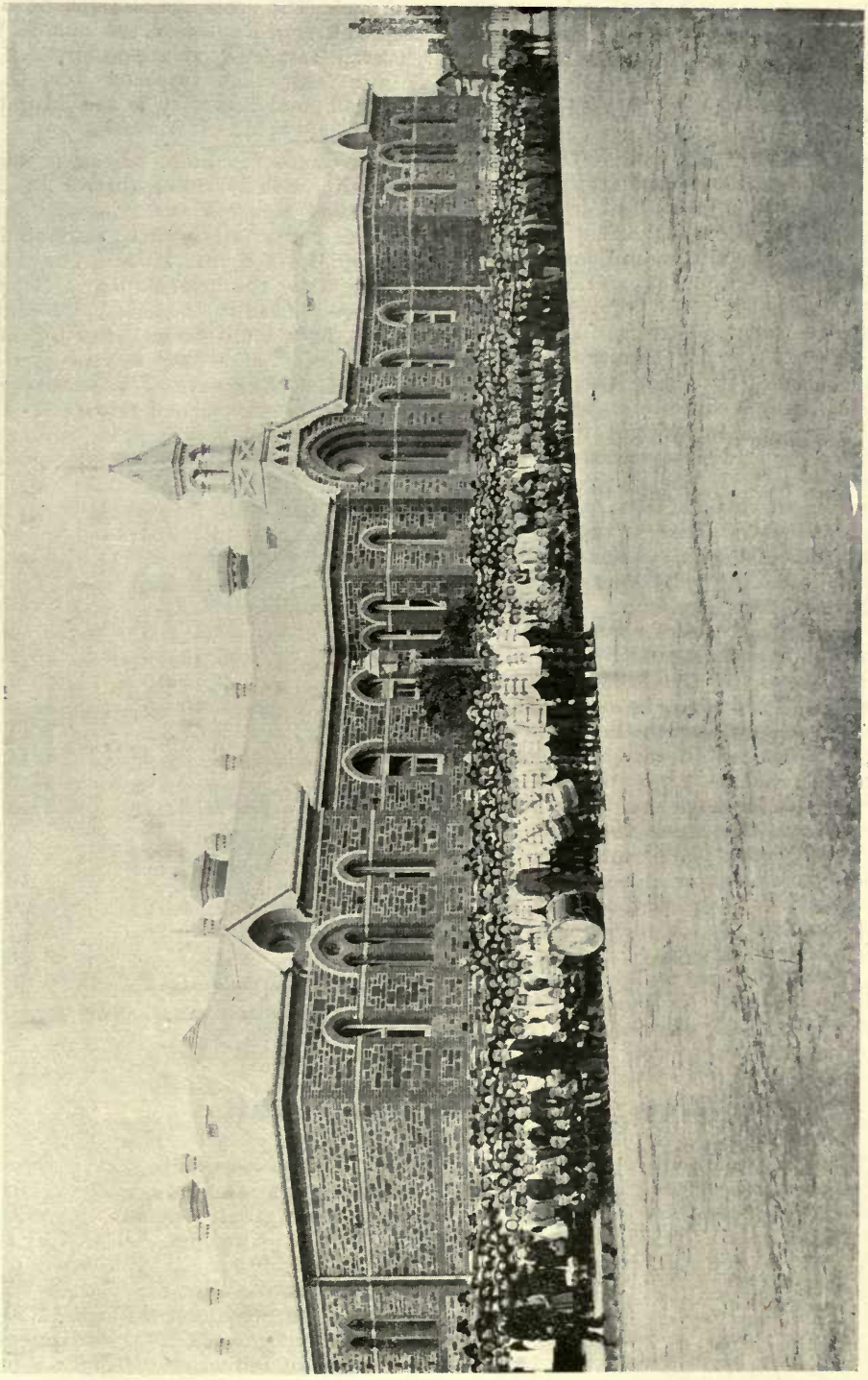
The State primary schools are of two kinds—public schools, under certificated teachers, and provisional schools, taught by uncertificated teachers. The latter, however, are required to undergo a special examination, and to serve in an efficient school for a specified time. The public schools are divided into twelve classes, and the salaries of head male teachers range from £90 in a Class XII. school, with an average attendance of twenty to thirty, to £450 per annum in a Class I. school, with an average attendance of 600 or over. The annual increment is £10 in each case for male teachers, the salaries of head female teachers range from £92 to £156. A lady cannot be appointed head teacher to a school in any class above IX.

The course of study and the standard of examination is exactly the same in both public and provisional schools. A strict supervision is kept upon the daily working of the schools by means of a staff of inspectors. Districts are allotted, and the inspectors pay periodical visits, subjecting the classes to a critical examination, and allotting percentage marks which affect the reputation of both teachers and scholars.

For the benefit of those desirous of devoting their lives to teaching, an excellent training college was established in 1876. All students were non-resident. The term of training in this college, after passing successfully through a four years' pupil teacher's course, was for one year, and the student's time was about equally divided between study under the master of the college, and in some cases at the University, and in the practical teaching in a Class I. school under a training master. In 1900 a new scheme of training was introduced. The Council of the University of Adelaide, having received a large bequest under the will of the late Sir Thomas Elder, made a generous offer to the Minister of Education, by which those in training for teachers would be allowed to have a two, and some a three, years' course of study for the B.A. or B.Sc. degree free of cost. It was, therefore, arranged that candidates are, after showing a capability to teach (as monitors), admitted to the Pupil Teachers' School, where they study for two years to pass the junior and senior public examinations (the latter being the matriculation standard of the University). After this they spent two years teaching in the larger public schools, and then enter the University Training College for another two, and possibly three years, as stated above. During the term of training students receive a maintenance allowance of from £30 to £80, according to circumstances.

State "secondary and higher" education is confined to an "advanced school for girls," and the subsidising of such institutions as the School of Mines, College of Agriculture, Public Libraries, Art Galleries, &c. Higher education for boys is still attended to by private establishments.

For the encouragement of secondary education the following University scholarships are offered annually, and are tenable for one year:—A. Entrance scholarships



A Typical State School.

for day students—one of the value of £35, one of £30, and one of £25. Those scholarships are open to all candidates under eighteen years of age, who have resided in the State for one year, but who have not previously attended any part of the day undergraduate course at the University. B. Undergraduate Scholarships.—Three scholarships to first year students of the value of £35, £30, and £25 respectively. Three scholarships to second year students of the value of £35, £30, and £25 respectively. Scholarships are offered annually to evening students in Arts or Science. To enable boys from the primary schools to enter the secondary schools, 6 public exhibitions, tenable for 3 years, are provided by competitive examinations each year to boys from any schools in the State. Besides these, 18 exhibitions, also tenable for 3 years, are offered each year to boys attending the public (i.e., Government) schools. For Girls.—Six public bursaries are offered to girls, tenable for 3 years, from any school in the State, and 18 bursaries, also tenable for 3 years, are offered to girls attending public schools. All the above give free tuition and books, with an allowance not to exceed £25 per annum in cases where the residence of the parent is not within easy reach of Adelaide. In addition to this, 2 junior scholarships for boys and 2 for girls are offered each year which give free tuition and books and an allowance of £15 for maintenance to allow those who reside in the country to attend a school with a sixth class, and to study for the primary examination of the University in order to give children in the country the same opportunity to compete for the exhibition and bursaries as those who reside in the large centres. The head of the Department is the Minister of Education, the Hon. L. Von Doussa, Inspector General Mr. L. W. Stanton, Assistant Inspector Mr. C. L. Whitham, and Secretary to the Education Department is Mr. H. A. Curtis.

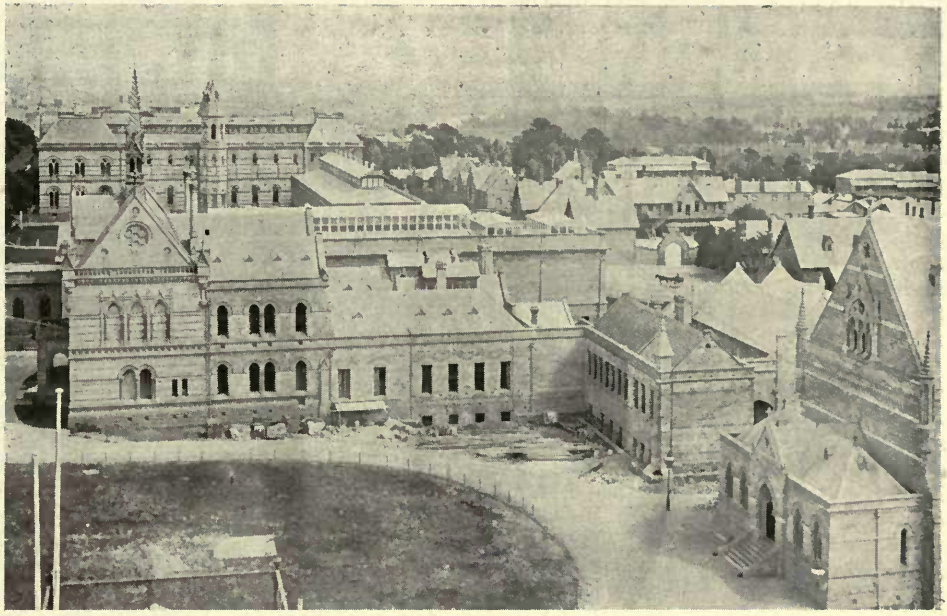
There were 716 State schools in South Australia, with 57,973 on the roll in 1902, with 1,341 teachers, including 233 monitors, and the salary list amounted to £126,507 for the year 1902. The cost of education for the year ending, December, 1902, was (primary) £149,392; secondary, £2,069, or a total—after deducting profit on the sales of books, fees received—of £151,461. Exclusive of expenditure on buildings, improvements, repairs, &c., the amount spent on buildings, improvements, land, &c., from 1876 to 1902, amounted to £501,000. The cost per child educated, and also per child in average attendance since 1888, are shown thus:—

	Cost per Child Educated.	Cost per Child in Average Attendance.
1888	£2 10 3	£4 0 3
1889	2 12 0¼	4 2 2
1890	2 11 10	4 4 3
1891	2 10 8¾	4 0 2
*1892	2 7 1	3 11 1
1893	2 5 3	3 14 10
1894	2 3 0¼	3 5 2¾
1895	2 3 7¼	3 5 5
1896	2 3 10	3 4 11
1897	2 4 4¾	3 4 10¼
1898	2 4 6¾	3 10 0¼
1899	2 4 9½	3 6 1¾
1900	2 6 6¾	3 7 4¾
1901	2 7 4¾	3 8 5
1902	2 7 5¼	3 9 11

*Free education introduced.

The Adelaide University.

The higher grades of education are well represented in a splendidly managed University, School of Mines, Agricultural and Private Colleges. The University of Adelaide was established by Act of Parliament in 1874. In 1881 Royal Letters Patent were issued by Her Majesty the Queen declaring that the degrees granted by it should be recognised as academic distinctions and rewards of merit, and be entitled to rank, precedence, and consideration throughout the British Empire as if granted by any University in the United Kingdom. The University owes its origin to the munificence and public spirit of the late Sir Walter Watson Hughes and Sir Thomas Elder, G.C.M.G., each of whom gave £20,000. Parliament provided for an annual grant from the public revenues of a sum equal to five per cent.



Group of Educational Buildings, North-terrace, showing the Conservatorium of Music, University, Museum, and Art Gallery.

on the capital funds then or afterwards to be possessed by the University, but not exceeding in any one year the sum of £10,000. Under the authority of the same Act an endowment in land of 50,000 acres and a grant of five acres in the City of Adelaide as a site for the University buildings were made. The University grants degrees in Arts, Science, Law, Medicine, and Music, and Diplomas in Music and in Mining Engineering and Metallurgy. It was the first University in Australia to provide for the granting of degrees to women, as authorised by Act of Parliament in 1880. At first the professorships founded in the University were four in number, their subjects being the following:—(1) Classics and Comparative Philology and Literature; (2) English Language and Literature, Mental and Moral Philosophy; (3) Mathematics, and (4) Natural Science. The first and second were established in accordance with the terms of Sir Walter Watson Hughes' donations, and bear his name, the third and fourth carry in the same way the name of Sir Thomas Elder. The academical work of the University was commenced in March, 1876, the number of matriculated students being 6, and of non-graduating students attending lectures 52. The foundation-stone of the University buildings was laid by His Excellency Major-General Sir W. F. D. Jervois, K.C.M.G., on July 30th, 1879, and the buildings were opened by him in April, 1882. Their total cost, including that of subsequent additions, was about £38,000. In 1883 Sir Thomas Elder, G.C.M.G., made a second gift to the University amounting to £10,000, for the foundation of a School of Medicine. The University Council thereupon established a Chair of Anatomy and a Lectureship in Physiology, and made further provision for the first two years of the medical course. In 1886 arrangements were completed for a complete medical curriculum. In 1884 the Hon. J. H. Angas, M.L.C., gave £6,000 for the endowment of a Chair of Chemistry, and in the following year the first Angas Professor of Chemistry was appointed. The Chair of Music was established in 1884 and a Professor of Music appointed. This chair had no special endowment, but through the efforts of His Excellency Sir W. C. F. Robinson, K.C.M.G., it was supported for the first five years by voluntary subscriptions from the public amounting to

£530 per annum, of which sum Sir Thomas Elder contributed £300 yearly. In 1890 the Council established a Professorship of Law in place of the Lectureship in Law which had existed since 1883. In 1878 the Hon. J. H. Angas gave £4,000 to provide for scholarships to encourage the training of scientific men, and especially civil engineers, with a view to their settlement in South Australia. In 1892, and again in 1897 and 1899, Mr. Robert Barr Smith presented to the University £1,000 for the purposes of the library. During the year 1900 two other donations for £1,000 each, and during 1902, £500, for the further purchase of books, were made by Mr. Barr Smith. The library now, in consequence of the large additions rendered possible by these gifts, contains about 14,500 volumes. Sir Thomas Elder bequeathed to the University the sum of £65,000, his total gifts to the institution amounting from first to last to nearly £100,000. By the terms of his will the bequest was apportioned in the following manner, namely, £20,000 to the School of Medicine and £20,000 to the School of Music, while the residue was left available for the general purposes of the University. An Elder Conservatorium of Music was accordingly established in 1898, in which instruction is given in all branches of musical education. The foundation-stone of the Conservatorium building was laid by Governor Sir Thomas Fowell Buxton on September 26th, 1898. The Conservatorium, which contains a large public hall and an admirable suite of classrooms for instruction in music, was completed in February, and formally declared open by His Excellency the Governor, Lord Tennyson, on the 26th September, 1900. In consequence of the large increase in the number of students and the absolute necessity for increased accommodation for the Engineering and Science Schools, a large suite of rooms has been built during the past year. In 1898 the Council was enabled, by means of Sir Thomas Elder's bequest, to make arrangements for a post-graduate course in Mining Engineering and Metallurgy, and for the granting of a diploma in these subjects. The University is governed by a Council, which usually consists of twenty members, elected by the Senate, but which consists of twenty-one members whenever the Chancellor at the time of his election to that office is not a member of the Council. The Senate consists of all graduates of the degree of Master or Doctor, in any of the several faculties, and of all other graduates of three years' standing, besides graduates of other Universities who have been admitted *ad eundem gradum* by the Council. The number of graduates admitted by examination since the establishment of the University is 265. The number of undergraduates in the year 1902 was 311, and of non-graduating students 287, exclusive of those studying at the Elder Conservatorium, of whom in 1902 there were 286. The teaching staff of the University comprises 9 Professors and 19 Lecturers, and that of the Elder Conservatorium 12 Teachers. Facilities for University examinations have been extended to the country, and local centres with permanent committees have been formed, for examinations in Music only at Broken Hill, and for the Primary, Junior Public, Senior Public, Higher Public, and Music Examinations at Mount Gambier, Naracoorte, Port Pirie, Clare, Jamestown, and Moonta, and at Albany and Perth in Western Australia. In the interests of education, Extension Lectures have also been given in country centres, as well as at the University. Public examinations are conducted at country centres and the "extension" of the University system to remote parts of the State represents one of the most significant evolutions in higher education. The Adelaide University has important relations with Western Australia, and the Technical School at Perth is affiliated, and some of the lectures are recognised by the Adelaide University.

The scope of University teaching has been widely extended during the past few years. The extension of the curricula, and the steady growth of students have compelled the Council to provide extra accommodation. A public demand for commercial education has been met by providing an advanced course. The Elementary Commercial Examination was held for the first time in December, 1902, when 20 candidates presented themselves, and 13 received certificates. The success of the experiment induced the Council to establish a Board of Commercial Studies.

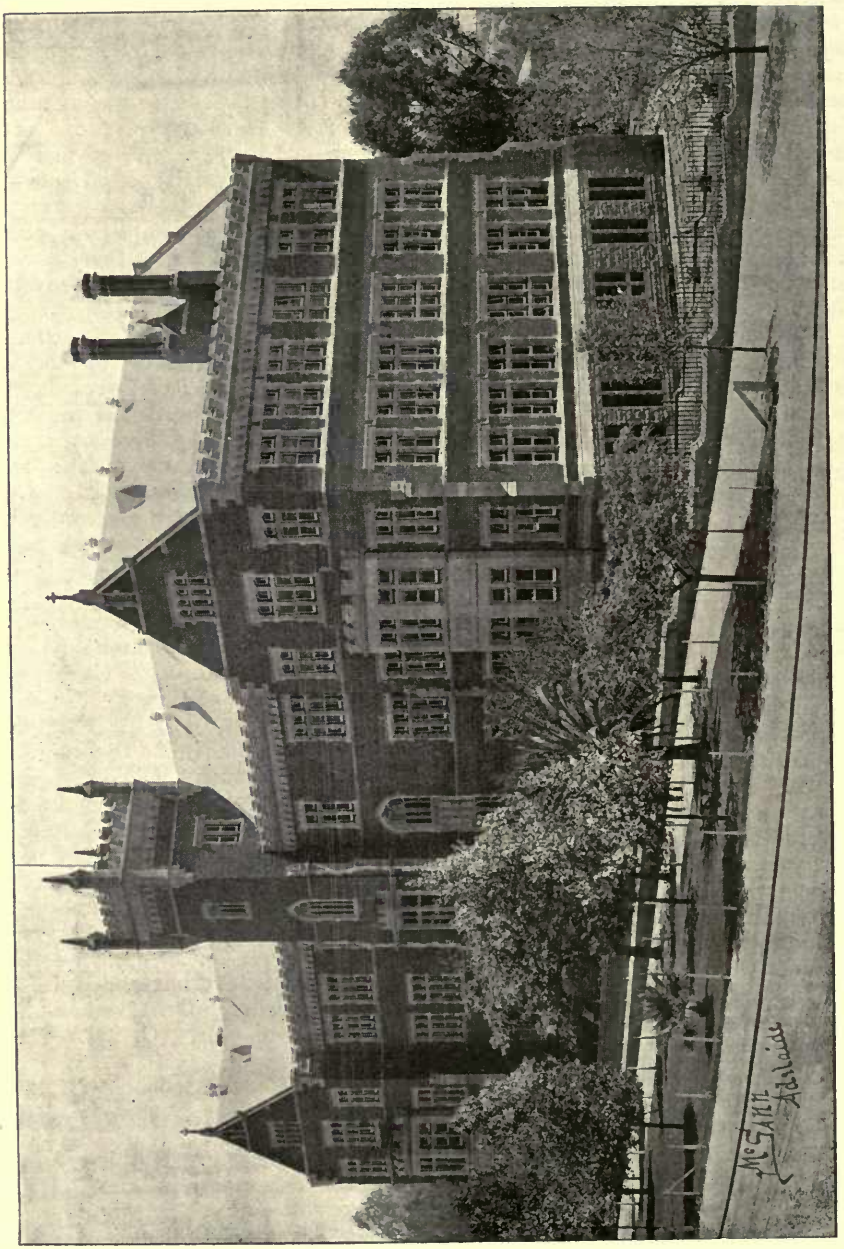
To obtain the advanced commercial certificate candidates must attend lectures and pass examinations in the following subjects, which need not be all taken in the same time:—(1) Business Practice; (2) Accountancy; (3) Commercial Law; (4) Economics and Commercial History; (5) Banking and Exchange; (6) Commercial Geography and Technology. The lecture fees for the full course amount to £12/1/6, which, with examination fees, makes a total outlay of £14/12/6. In connection with the scheme of commercial education, Mr. Joseph Fisher, a very old colonist, has provided an endowment of £1,000 to provide for a lecture on a subject relating to commerce. Other leading commercial men are coming forward and providing scholarships, so that the success of the educational venture is assured.

A popular form of University teaching are the "Extension Lectures" given by the staffs. These are largely attended during the winter. The last series included such subjects as "The Electron and the Radioactivity of Radium, Thorium, and other Substances," "Color in Nature," "Shakespeare's Romantic Plays," "Leaders of the Middle Ages," "The Development of the Violin Sonata," and "Materialism." The University aims at giving a "complete academical and professional and special training to all the candidates of the teaching profession in Adelaide free of charge, and without adding a sixpence to the burdens of the taxpayers," and the Chancellor further said that "there was no event in the history of education in South Australia of far more reaching importance" than the arrangement which had been concluded for training school teachers. "It secured to every teacher in South Australia, to every one of that important Public Service, the social status to which they were entitled. It secured to them a professional training of a high-class, and some of the benefits of the endowments of the University of Adelaide. He knew of no other University in the world that attempted anything of the kind." The Chancellor went on to say that the teachers get "the advantage of training at the University for two years, which in the aggregate amount of fees would total about £1,400. That was to say that the University presented the students with £1,400. They had the assistance of 14 professors and lecturers and four demonstrators. They had the use of a library of 15,000 volumes, and laboratories which had cost £10,000. They were the pioneers in breaking down the narrowness and exclusiveness of class which recognised the republic of letters alone, and demanded that the teacher was as much a member of the learned professions as the doctor and the lawyer. They had on a small scale the University pupil continuation school in those who were working in the evenings for the completion of the course and to obtain the authorization of the University degree." The University and the School of Mines co-operate in providing courses of instruction and examination in various branches of Applied Science, and this union of forces is both economical and effective. An important development of the University movement in South Australia is the training of school teachers. The Chancellor of the University, in a recent public utterance, claimed that there was no other country in the world in which the University provided for candidates in elementary school teachership a free, a compulsory, and a liberal education. The number of professors, lecturers, and teachers has increased from 5 in 1882 to 39 in 1902; undergraduates from 12 to 311; non-graduating students from 99 to 287, and the number of Conservatorium students from nothing to 286; or a total advance from 111 in 1882 to 884 in 1902. The number of candidates for public examinations in the same period has risen from 141 to 2,799. A large number of valuable scholarships and exhibitions are made available every year.

The Right Hon. Sir S. J. Way, Bart., K.C., Lieutenant-Governor and Chief Justice, is Chancellor, Dr. Barlow Vice-Chancellor, and Mr. C. R. Hodge Registrar.

The School of Mines.

South Australia is greatly blessed in its "School of Mines and Industries," an institution which in everything but name is a high-grade Technical College. It is the largest and most efficient training establishment of its kind in Australia. Yielding to the pressure of strong public sentiment on the question, the Downer Government, in 1886, appointed a board "to enquire into



Adelaide School of Mines and Industries.

and report upon the best means of developing a general system of technical, including agricultural, education in the province." The Board consisted of Dr. (now Sir John) Cockburn (then Minister of Education), the late Hon. Dr. Campbell, M.L.C., Professor Rennie, the late Mr. M. P. F. Basedow, Messrs. Rowland Rees, J. T. Scherk, M.P., Mr. (now Representative Sir) J. Langdon Bonython, the late Mr. Adam Adamson, and Mr. J. Fairfax Conigrave. Soon after the appointment the Government also remitted for the board's consideration the question of the establishment of a School of Mines. This proposal, having been made a portion of the policy of the Playford Government, the consideration of how this object could be best accomplished was relegated by the then Minister of Education (Mr. J. C. F. Johnson) to the Technical Education Board. After visiting similar institutions in the neighboring States, and collecting much valuable information, this body, in June, 1888, recommended in a comprehensive report that a School of Mines and Industries should be established. The recommendation was given effect to with surprising promptness, for on November 30 the Council—a thoroughly representative body—was appointed. Six members were nominated by the Government, and the remaining six were elected by the University, the Board of Governors of the Public Library, Museum, and Art Gallery, the Chamber of Manufactures, and the Trades and Labor Council. At the beginning of 1889, so the annual report of that year says, active steps were taken to organise the school, and to start work with as little delay as possible. Dr. Cockburn was appointed Chairman, and he threw his heart and soul into the project. It was his untiring zeal and able organization at the outset that gave the movement an impetus that was ever sustained. The Government handed over to the Council the eastern annexe of the Exhibition Building, where class-rooms were provided and exhibits constituting the nucleus of a technological museum were displayed. The actual work of the school began on March 14, 1889. On that day 26 students were enrolled, and the curriculum contained 11 subjects. Success was immediate, and at the time of the formal opening of the institution by the Governor (Lord Kintore) three months later, the most sanguine expectations of the officials had been more than realised. This is what "The Register" said at that period:—"The School of Mines and Industries is admirably devised to secure the particular ends at which it aims. Its constitution and arrangement are elected, the labors of the Council having enabled them to adopt the best points in kindred institutions throughout the world. . . . . There seems already to have been established between the students and the authorities that oneness of purpose and unity of effort which are essential to the well-being of such an institution." Over 2,000 people attended the opening ceremony, and up to that date 100 students had enrolled. The progress made was indeed remarkable. At the end of 1890 there were 341 pupils on the roll; at the end of 1891, 468; 1892, 620; 1893, 667; 1894, 688; 1895, 670; 1896, 809; 1897, 957; 1898, 1,041; 1899, 1,266; 1900, 1,603; 1901, 1,756; and 1902, 1,913. In 1892 the Government Assay Department was placed under the control of the Council, and in December of that year Parliament passed an Act to incorporate the school. The necessity for increased accommodation was felt for many years. It is hardly probable that any alteration from inadequate arrangements would have been possible but for the princely generosity of the Hon. G. Brookman, M.L.C., who donated £15,000 towards the erection of a new building, the total cost of which was £37,000. This handsome contribution prompted the Government to at once proceed with the erection of up-to-date premises, and the Council can now congratulate itself on the possession of a building which in magnificence is second to none in the Australian States. On the occasion of the opening ceremony of this magnificent structure, the following letter, addressed to the President (Representative Sir Langdon Bonython) by Lord Tennyson, the Governor-General, was read:—"Commonwealth of Australia. Governor-General, Marble Hill, Adelaide, February 23, 1903. Dear Sir Langdon—I congratulate the Government and you on the opening of the fine building where is to be housed your excellent School of Mines, of which you have been for so many years the leading spirit. I am glad to learn that you

are working hand in hand with the University of Adelaide, and I have much pleasure in testifying again to the very valuable service your school performs for Australia. It is certainly one of the best of its kind that I know, and many of the men trained here are to be found in all parts of the world holding good positions. Yet Australia is, generally speaking, a long way behind in the race of technical handicrafts and industries. For instance, when I have visited agricultural shows throughout this continent, everywhere I have found the stump-jumpers and strippers, of which the South Australians are justly proud; but, be it observed, most of the other implements and agricultural machinery are made in Canada and America. In order to keep pace with the times, Australia will have to bestir herself, to welcome fresh ideas and inventions, to encourage the introduction of new and improved methods, to place no artificial restrictions—to the detriment of production and trade—on the output of commodities and manufactures; and, above all, she must multiply her technical schools and better her technical education. It is, more than anything else, the training (in the workshop) of those directing scientific industries, as well as of the workers themselves, which makes a great industrial community. By adopting such means, with the aid of practical enthusiasts like your Lieutenant-Governor, Mr. Brookman, and yourself, Australia will, I feel sure, be able eventually to develop her wonderful resources, and to attain to her rightful position among the industrial and commercial peoples.—Yours truly (Signed) TENNYSON." The reproach that Australia is a laggard among nations in the matter of "technical handicraft and industries" is rapidly being removed by such institutions as the South Australian School of Mines. The President, on the occasion of the last prize-day of the school, said:—"The wool of 250,000 sheep has passed through the hands of our students this year, and wool experts estimate that, by reason of better classing ,the wool has yielded to the producer fully £6,000 more than would otherwise have been received. But the £6,000 by no means represents the total gain to South Australia. There is the wool dealt with by former students; and by those who have been taught by such students; and the day is coming when the whole wool clip of the State will be so manipulated as to reach the markets in the best possible condition, and that will mean a clear gain to South Australia of at least £100,000 per annum." The wool instructor (Mr. Geo. Jeffrey) has nearly 200 students under his charge, and the work done by them at shearing time on the stations is admittedly excellent.

The members of the Council at the present time are:—Representative Sir John Langdon Bonython (President), Henry Adams, Esq., J.P., Honorable John George Bice, M.L.C., Professor William Henry Bragg, M.A., David Morley Charleston, Esq., Lawrence Grayson, Esq., A.I.M.E., J.P., Representative Honorable Sir Frederick William Holder, K.C.M.G., Joseph Colin Francis Johnson, Esq., F.G.S., A.I.M.E., J.P., Representative Alexander Poynton, Richard Edward Elmore Rogers, Esq., J.P., Johann Theodor Scherk, Esq., M.P., Edward Willis Van Senden, Esq., Registrar of the School and Curator of the Museum, Joseph Auburn Haslam, B.Sc.

Agricultural College.

Technical education on the agricultural side has received considerable attention. In addition to a well-equipped Agricultural College, situated at Roseworthy, 30 miles north of Adelaide, there are Agricultural Bureaux scattered throughout the State, whilst secondary agricultural instruction is obtainable at many of the public schools. In 1879 the late Hon. F. Basedow carried a resolution in Parliament in favor of the "establishment of an experimental farm and agricultural college." A site about three miles west of Roseworthy was selected, 830 acres of land was purchased at £6/6 per acre, and the college erected at a cost of about £6,000. Some of the land was poor, and for this and other reasons Professor Lowrie several years later characterised the selection as an unfortunate one. The area was added to in 1897, when a contiguous block of 187 acres was secured at £4 per acre In 1898 220 acres was purchased at the same figure, in 1899 65 acres at £3/5, in 1900 178 acres at £4, and last year 175 acres at £3/15. The total area at present is, therefore, 1,655 acres. The objects of the institution were declared

to be:—(1) To train young men for the practice of agriculture, horticulture, and viticulture; (2) To conduct experiments with a view to the advancement of the rural industries in South Australia. Professor Custance, the first principal, was in charge from 1881 until 1886. He was succeeded by Professor Lowrie, M.A., B.Sc., who arrived in February, 1888, and retained the position until September, 1901, 13½ years. During that period a striking change took place in the public estimate of the institution and the methods of agriculture demonstrated at Roseworthy. Professor J. D. Towar, M.Sc., took over the control in May, 1902. When Professor Lowrie arrived in 1888 the teaching staff comprised a science lecturer and himself. Four years later, Mr. Arthur J. Perkins, fresh from Montpelier, was appointed Government Viticulturist and Œnologist, and has rendered valuable service to the State in that capacity ever since. That gentleman is now the oldest member of the College staff, and also holds the office of Secretary for Agriculture. Professor Perkins was acting principal from the departure of Professor Lowrie until the arrival of Professor Towar. As the College advanced in popularity, and the number of students increased, the staff was gradually added to until to-day it is composed as follows:—Principal, Professor J. D. Towar, M.Sc.; Viticulturist and Œnologist, Professor A. J. Perkins; Housemaster, Secretary, and Lecturer on Natural Science and Bookkeeping, Mr. F. W. Russack; Lecturer Chemistry and Physical Science, Mr. W. R. Jamieson, B.Sc.; Lecturer on Dairying, Mr. G. S. Thomson, F.R.S.E.; Lecturer on Horticulture, Mr. G. Quinn; Lecturer on Wool-classing, Mr. G. Jeffrey; Superintendent of Vineyard, Mr. H. E. Laffer; Teacher of Surveying, Mr. R. L. E. Bosworth, B.Sc.; Farm Foreman, Mr. F. L. Faulkner; Teacher of Blacksmithing and Carpentering, Mr. G. L. Williams. Altogether 355 youths have been enrolled at the College, and of these 106 have obtained their diploma. In 1890 the system of offering scholarships for competition annually, each carrying a free course of instruction at the College, was adopted. Since that time 29 scholarships have been awarded. Last year's gold medallist entered the institution as a scholarship winner, and the silver medallist of the previous year likewise. Six scholarships are offered annually, the State being divided into so many districts for the purpose. For several years the course of instruction at the College covered two years; but soon after his arrival Professor Lowrie pointed out that this term was too short, and urged that it should be extended to three years. The recommendation was adopted as from the beginning of 1893. The curriculum is as follows:—First year.—Mathematics, anatomy, bookkeeping, agriculture, chemistry, meteorology, heat, electricity, and botany. Second year.—Mathematics, physiology, chemistry, agriculture, viticulture, fruit culture, mechanics, surveying, and wool-classing. Third year.—Chemistry, agriculture, veterinary science, viticulture, œnology, surveying, mechanics, physiology, and wool-classing. Students who desire to attend only two years are required to pass an entrance examination equivalent to the sessional examination at the end of the first year. The fees were originally fixed at £50 per annum, but in 1888 they were reduced at £30, at which amount they now stand.

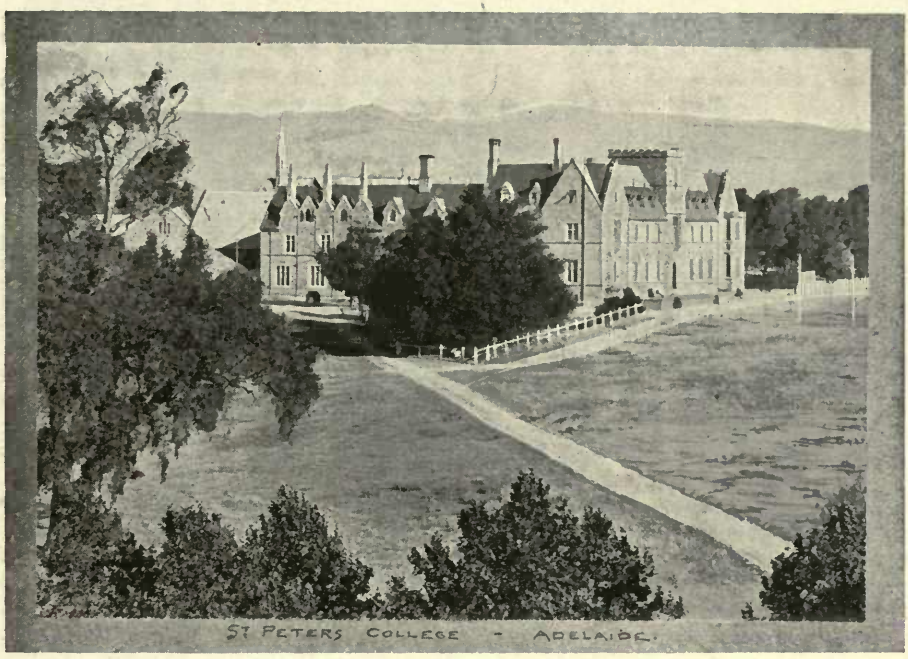
It is impossible to estimate in sterling value the beneficial influence exercised by this College on the agricultural industry during the past twenty years. It has led the way in revolutionising farming methods in South Australia, and to Professor Lowrie more than to any other man is due the rapid expansion of the system of drilling in seed with artificial manures. His staff and enterprising farmers ably seconded his efforts, but Professor Lowrie headed the revolutionary band. The work he began is being carried on with skill and enthusiasm by his successors.

Special attention is devoted at the Agriculture College to "diversified farming," and valuable experiments are conducted in live-stock breeding—more particularly the production of lambs suitable for export.

There is a "Council of Agriculture" appointed by the Government which acts in an advisory as well as executive capacity, and experts are connected with the Department of Agriculture. A monthly illustrated journal is issued containing special articles by the staff and reports of proceedings of Country Agricultural Bureaux.

Public Library, Art Gallery, and Museum.

The Public Library, Museum, and Art Gallery of South Australia was established in 1884. Under the name of the South Australian Institute it was incorporated in 1856. It comprises a free public reference library, a natural history museum, an art gallery, and a school of design, painting, and technical arts. Affiliated with it are the Royal Society of South Australia, the South Australian Society of Arts, and 166 country Institutes. It is governed by a board of 18 members, of whom 8 are nominated by the Government, 5 are elected by the country Institutes, 2 by the University of Adelaide, and one each by the Royal Society of South Australia, the S.A. Society of Arts, and the Adelaide Circulating Library. At the laying of the foundation-stone of the Public Library building, Mr. Rowland Rees, referred to the University of Adelaide as "an institution which will provide that higher education hitherto unattainable at common or ordinary schools. . . . It remains to supply the middle course of the structure to connect primary with secondary schools by links composed of higher subjects, the secondary education being that acquired after the elementary school days are passed, and composed of teaching bearing on the life work of the people, if need be, where social necessity arises, cultivation in the highest form which the University provides, as well as in the 'elegancies of literature and art and the pursuit of science for its own sake apart from its utility.' . . . . We are met to-day to witness the laying of the first stone of an institution intended to provide those missing links in the great educational chain to which I have alluded." The objects thus outlined have been strenuously pursued by the Board with much success, although very often under adverse circumstances. The Public Library was opened in 1884 with a collection of about 21,500 volumes, which had increased in December, 1903, to 50,450. A travelling library, containing 6,000 volumes is circulated in boxes among affiliated country Institutes. Each box contains 30 volumes, and each Institute changes its boxes three times a year. A special library of technical and scientific works is also available for circulation among country Institutes. The Museum in 1884 occupied the northern half of the Library building, but in 1895 the present Museum building was handed over to the Board, and even this building, 200 ft. x 45 ft., is now taxed to its utmost to accommodate the specimens, and the director is applying for increased space. The Australian ethnological collection in this Museum is claimed to be the finest in the world. The Art Gallery in 1884 was located in a room at the south end of the Public Library, but was afterwards removed to rooms in the Exhibition Building. Here for some years the collection was housed in a building of a very inflammable character. The Board felt that this was a serious menace, and it was, therefore, a very great relief to them when it became known that Sir Thomas Elder, K.C.M.G., had left a legacy of £25,000 for the purchase of pictures. The Government then recognised the necessity of erecting a suitable Art Gallery building at once, and this was opened to the public on April 7th, 1900. The Elder bequest has made it possible for the Board to add some fine examples of the leading modern artists to the collection, and a large portion of the bequest still remains unexpended. The art school, under the directorship of Mr. H. P. Gill, A.R.C.A., Lond., has grown to large proportions. The students in training under the Education Department, as well as those in the S.A. School of Mines and Industries, receive their art education in this school. Art examinations are held under the authority of the Board in Adelaide and various country towns, and also in Perth, W.A. In 1904 drawing will be a subject for the University, Primary, Junior, and Senior Public Examinations, and the Board's certificate is to be accepted by the University authorities as proof of efficiency in art subjects. A South Australian Mechanical Draughtsman's Certificate is issued jointly by the Board and the Council of the S.A. School of Mines and Industries, and another by the Board and the Council of the Moonta School of Mines. About 650 students were taught in the Art School in 1903, and since 1888 20,503 examination papers have been worked by candidates for the Board's certificates, of



St. Peter's College, Adelaide.

which 12,500 have been issued. The prospects of the institution have been greatly improved by a magnificent legacy from the late Dr. Morgan Thomas. This estate has not yet been wound up, but it is expected that the Board, who are residuary legatees, will receive at least £60,000, and a considerable portion of this has already been paid over. The Public Library and its associated departments is doing excellent educational work. The Royal Society, a branch of the Royal Geographical Society, the Zoological Society, with its magnificent collection of animals, the Botanical Gardens, are all rendering great public service in the same direction. South Australia is also well served by an excellent metropolitan and country press.

St. Peter's College.

The Collegiate School of St. Peter, the oldest school in the State, was first opened on July 15, 1847, its purpose being to provide a good sound education on Church of England principles, with a conscience clause admitting boys of all denominations. The course of instruction is similar to that of the public schools of England. The school is situated in the eastern suburbs of Adelaide, about 1½ miles distant from the city, and is surrounded by 30 acres of playgrounds, with a further 23 acres available if required. The sanitary arrangements (on the deep drainage system) are perfect. There are 15 large and well-ventilated class-rooms, an excellent laboratory for practical chemistry and physics, a gymnasium 90 ft. in length, fitted with all the latest and most complete appliances, and a very handsome chapel in which services are held daily. Accommodation is provided for about 60 boarders. The boarding arrangements are under the direct supervision of the headmaster, assisted by 7 other resident masters and a matron. Cricket, football, rowing, bat and hand fives, and other outdoor sports are organised and encouraged. The scholarships and exhibitions given by the school have an annual value of £800, the most valuable of which are six scholarships of £50 per annum each, tenable for three years. The institution is managed

Prince Alfred College, Adelaide.

by a Council of Governors consisting of 15 members, of which the Lord Bishop of Adelaide is *ex officio* chairman. The Headmaster is the Rev. Henry Girdlestone, M.A., of Magdalen College, Oxford, and he is assisted by a staff of 14 masters. Mr. A. E. H. Evans, King William-street, is secretary and bursar. The average attendance is about 300 boys.

Prince Alfred College.

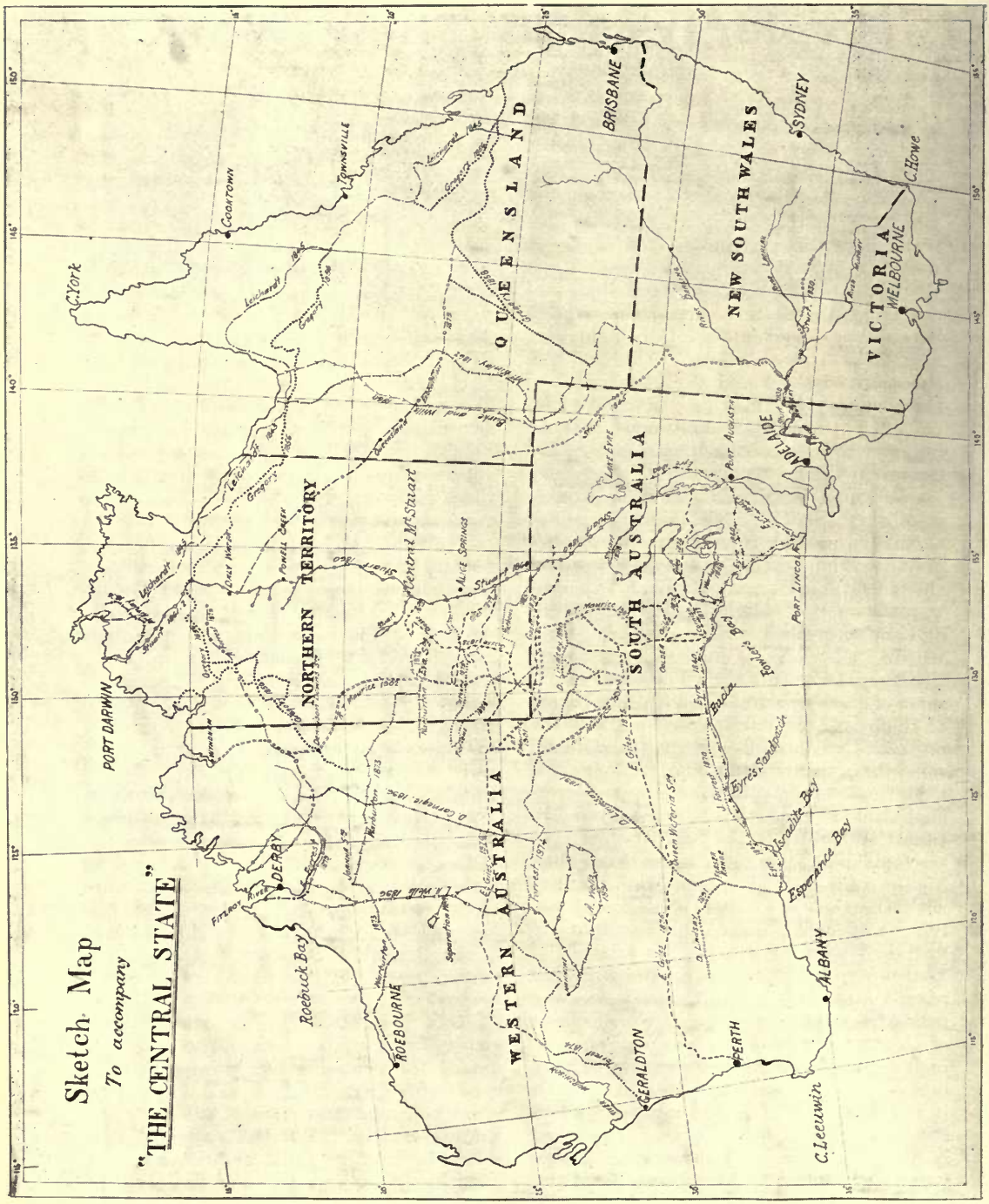
The foundation-stone of Prince Alfred College was laid in 1867 by the late Duke of Edinburgh, and the institution was named after him by special permission. At first only the central portion was erected, but continued prosperity caused the original design to be completed by the addition of the Waterhouse Wing in 1878 and the Colton Wing in 1882. A further addition was made in 1891, when a separate building was put up for science lecture room and laboratory, thoroughly equipped with the latest appliances. The school was founded by members of the Wesleyan Methodist Church, and the governing board has for its chairman the President of the South Australian Conference, annually appointed. It has always claimed to be a "modern" school, and has given much attention to mathematics and natural science. Its pupils have been eminently successful in these departments. The headmaster is Mr. F. Chapple, B.A., B.Sc. (Lond.), and he has under him an excellent staff of masters, both resident and visiting. At present the attendance numbers about 350, of whom over 70 are boarders.

Explorers and Their Work.

There's a legion that never was listed,
That carries no colors or crest;
But, still in a thousand detachments,
Is breaking a road for the rest.—KIPLING.

Australia owes a heavy debt to the men who filled in the map of the island continent. In that great work South Australia has been a generous contributor in men and money. The journals in which the leaders of the various expeditions sent out from this State recorded their sufferings and achievements are full of thrilling narratives of brave needs. The names of the men who devoted the best years of their lives in making pathways for posterity through a continent will be honored so long as the inhabitants of the Commonwealth preserve the spirit and ideals which inspired our heroic pioneer colonists. South Australians have reason to take a special interest in this branch of Australian history, because several of the most notable and brilliant explorers were intimately associated with this State, and accomplished much of their work within its borders. For many years after the first immigrants landed on these shores some of the shrewdest and most intelligent of them held the opinion that a great lake or inland sea would eventually be found somewhere near the centre of the continent. Not a few of the ablest explorers cherished the hope that they would be fortunate enough to be the first Europeans to set foot upon the shores of an Australian Mediterranean. Flinders was familiar with the theory, and when his vessel was lying at anchor near the entrance to Spencer's Gulf, he wrote in his journal:—"Large rivers, deep inlets, inland seas, and passages into the Gulf of Carpentaria were terms frequently used in our conversation of this evening, and the prospect of making an interesting discovery seemed to have infused new life and vigor into every man in the ship." Nearly 30 years later, when Captain Sturt landed in Sydney, the belief in the inland sea hypothesis had been greatly strengthened by the results of the exploratory work accomplished during the interval. The greater part of the immense coast line of Australia had been more or less carefully scrutinised, but by a strange coincidence both English and French navigators who visited Encounter Bay in 1802 failed to detect the mouth of the Murray River in the long line of sandhills behind those threatening breakers which dash unceasingly upon the Coorong beach. That omission was responsible for a great deal of the speculation respecting the probable inundation of Central Australia. The simple unadorned story of the methods by which the inland sea theory was exploded, and the actual condition of the interior revealed forms one of the most romantic and inspiring chapters of South Australian history.

The honor of having made the first important discovery in South Australia is due to Lieutenant Grant, who on December 3rd, 1800, sighted Mount Gambier from the deck of the Lady Nelson—colloquially known as "His Majesty's Tinder Box." The vessel was sailing along the coast towards Bass's Strait on her voyage from England to Sydney. Grant did not examine the shore of the Australian Bight, and he returned to England before Flinders made his systematic survey. When Governor King saw Grant's chart after the Lady Nelson reached New South Wales he made a note on the margin to the effect that he thought the appearance of the coast warranted the belief that the entrance to an inland sea would be found in the Bight. Grant can scarcely be regarded as one of the explorers of South Australia. The pioneer in that work was Captain Matthew Flinders, the intrepid young naval officer who discovered and named the two gulfs, the principal capes, headlands, bays, islands, and other prominent landmarks from Cape Nuy to Encounter Bay. Flinders possessed considerable literary skill, and he wrote a remarkably accurate series of pen pictures of the hitherto unknown coast of Southern Australia, which suggested the desirableness of founding a British province on the



Map of Australia, showing routes taken by explorers.

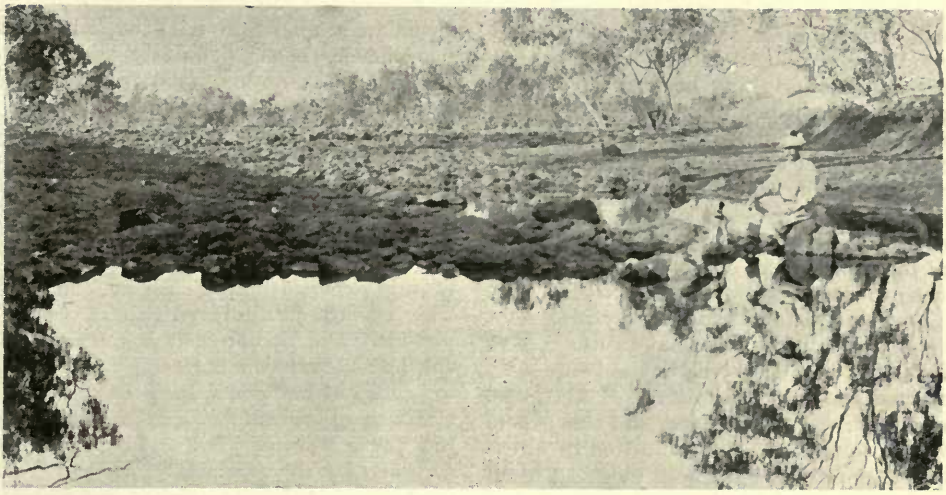
Central Mount Stuart. One of the most interesting geographical features in Australia, practically the centre of the continent.
F. J. Gillen photo.

southern coast of "New Holland." The meeting of Flinders and Captain Baudin, commander of the French exploring ship Le Geographe, in Encounter Bay, was a romantic incident which marked the completion of the British officer's original work on the south coast. Flinders was accompanied by Sir John Franklin, the celebrated Arctic explorer, who joined the Investigator as a midshipman. The monument which Franklin, when Governor of Tasmania, erected at Port Lincoln to the memory of his old commander serves as a link to connect the first of the splendid band of Australian explorers with the brilliant navigator whose life was sacrificed in an attempt to perform similar work amid the eternal ice fields of Arctic Seas.

Captain Sturt was the first explorer whose work on Australian soil was worthy to be compared with that which Flinders had accomplished on the water. His life and explorations have a special interest for South Australians. A considerable part of his colonial career was spent in this State, and the greatest task of his life was completed within its territory. Sturt was a man of dauntless courage, boundless energy, and shrewd common-sense. He started on his first expedition on November 10, 1828. After encountering many obstacles the party struck a large stream, but the water was so impregnated with salt that even the thirsty cattle refused to drink from it. After following the river for two days without finding fresh water, Sturt was compelled to return to the depot at Mount Harris. Before leaving the river he named it the Darling, after the Governor of New South Wales. The story which he had to tell on his return to the settlement only served to stimulate interest in the problems which he had been endeavoring to solve, and in September, 1829, the Governor gave instructions for a second trip. Sturt on this occasion was accompanied by Mr. (afterwards Sir George) Macleay, and the party was provided with a complete equipment, including a whale boat. The Murrumbidgee was reached on September 25, but as the expedition approached the meridian of longitude, at which most of the other unknown rivers exhausted themselves, the leader was concerned to find that there was not sufficient food to enable him to proceed further with his teams. He thereupon resolved upon the bold expedient of continuing the journey in the boat. On November 6 the boat party left its companions behind

and set out upon the eventful and arduous voyage. It was a bold enterprise, because every mile that the little craft floated down stream took the party further away from its base. Nobody had any idea where the river would end. The active hostility of the natives proved a severe strain. Sturt's verdict respecting that portion of South Australian territory has been condemned as unwarrantably pessimistic, but it must be remembered that by the time he reached Lake Alexandrina he was physically worn out, and had no time to examine the land beyond the immediate vicinity of the stream. Passing through the Great Lake, Sturt and his little band were mortified beyond description when they discovered that so noble a river as the Murray had so miserable a termination. From the first the explorer recognised that the Murray mouth would prove a drawback to the river trade. A subsequent examination confirmed his first impressions, and Sturt's opinion that the Murray mouth was not safe for navigation has been confirmed by experience. Keenly disappointed at finding that the river emptied itself into the sea at a point exposed to the full force of the ocean, Sturt began the long and toilsome journey back to the depot. The men under his command were ill-fitted for the task of pulling against the current day after day, and they suffered terribly from fatigue. When they left the Murray mouth their provisions consisted of a small quantity of flour. Game was scarce, and the party was constantly harassed by the natives. Yet for a whole month the men toiled like galley slaves at the oars, loyally obeying their chief's commands. Sturt records in his journal how he frequently overheard a man say to his companions at night:—"I must tell the captain to-morrow that I cannot pull any longer." When the morning came every man would be at his post. Not a murmur would escape their lips during the day. When the little party reached the place where the skiff had been launched for the downward journey the greatest disappointment of the voyage was experienced. They expected that stores would have been forwarded from Sydney to the depot there, but that had not been done. The next depot was 200 miles further up the stream, and 17 days elapsed before the emaciated men could lay aside their oars. One of the party became deranged when the boat was still 90 miles from its destination, and Sturt was compelled to form a camp. Two of the strongest men were sent on to endeavor to obtain help. A week went by, and then relief arrived. Every member of the party eventually returned to Sydney. Sturt's report to the Government of New South Wales created widespread interest, and the Governor instructed Captain Collett Barker, another officer in the 39th Foot, to examine the country in the vicinity of the Lakes and the Murray mouth more systematically than his brother officer had been able to do. It was while Captain Barker was endeavoring to carry out his commission in April, 1831, that he lost his life near the mouth through the treachery of the natives. Captain Sturt paid a heavy penalty for the strain to which his physical powers were subjected during that memorable trip. In 1838 he returned to South Australia, and was appointed Surveyor-General with a seat in the Executive and Legislative Councils. He subsequently became Commissioner of Crown Lands, Registrar of the Province, and Colonial Secretary. In 1844 Sturt conducted an expedition into the interior, but was compelled to camp at Rocky Glen for six months owing to the intense heat—the glass registering 130 degrees in the shade—and absence of water. He then pushed on to within 150 miles of the centre of the continent, and later discovered Cooper's Creek. His constitution was completely shattered, and his sight failed. Sturt was knighted on his death bed in 1869, but did not live to receive the title.

Edward John Eyre, whose sensational journey from Adelaide to King George's Sound in 1840-41 was attended by one of the most tragic episodes recorded in Australian history, was an explorer of the practical type, whose chief object was to endeavor to open up pastoral country in the interior. He was a daring and intrepid bushman, and the story of his adventures in this State and Western Australia is full of interest. Eyre, who died in 1902, was a native of Lincolnshire, the county in which Captain Flinders, Sir Joseph Banks, and Sir John Franklin were born. About two years after he settled in South Australia the question of opening



Attack Creek, north of Barrow Creek, where Stuart was attacked by the natives. Mr. F. J. Gillen is shown in the photo.
F. J. Gillen photo.

a stock route to Western Australia was mooted, and it was suggested that Eyre was the man to undertake so formidable a task. At a meeting held in Adelaide in 1840 he told the settlers interested in the project that he did not believe any track along the Australian Bight would prove practicable, but expressed his willingness to search for good pastoral country beyond Lake Torrens, which he had seen and named in the preceding year. The proposal was approved by the Government, and the fund raised by private subscription for the purpose of equipping a party was subsidised by a grant from the Treasury of £100. The expedition consisted of five white men and three natives, with 14 horses and 40 sheep. A stock of provisions was also dispatched to the head of Spencer's Gulf in a small sailing boat. Eyre left Adelaide on June 18, 1840, in company with his friend, Mr. E. B. Scott —who still resides in South Australia— Corporal Coles, John Baxter, and two native boys. They forced their way northward for 400 miles until they reached the basin of Lake Torrens. Baffled and bitterly disappointed, Eyre was eventually forced to the conclusion that he could not proceed further in that direction. "I had one of three courses to choose," he wrote, "either to give up the expedition altogether, to cross to the Murray to the east and follow up that river to the Darling, or, by crossing over to Streaky Bay to the westward to endeavor to find some opening leading towards the interior in that direction. After weighing all the advantages and disadvantages of each (and there were many objections to them all) I determined upon adopting the last." Eyre reached Streaky Bay and formed a depot there. Several weary months were spent in attempts to force a passage round the head of the Great Bight through country which Eyre characterised as "a hideous anomaly, a blot on the face of Nature, the sort of place one gets into in bad dreams." His third effort proved successful, and some idea of the dogged determination which he displayed may be formed from the fact that he travelled 643 miles in order to reach a point 153 miles distant from his depot. Having arrived at the head of the Bight, Eyre formed the daring and desperate plan of sending the majority of his party back to Adelaide while he proceeded to King George's Sound with packhorses, taking Baxter as his sole white companion. The horses were rested for several weeks, and, in spite of the fact that the Governor of the Province and Eyre's friends sent Mr. Scott back in order to urge him to relinquish the project, he refused to do so. Eyre and Baxter set out on their perilous journey from the head of the Bight on January 25, 1841. The two white men and three natives took with

them nine horses, a Timor pony, and several sheep. Seldom has such a hazardous undertaking been entered upon by a party so ill-equipped. Baxter lost his life before the goal was reached, and at one stage of the journey it appeared as though nothing could save the leader of the expedition from a similar fate. On one occasion the party was without water for four days, and on another it was reduced to such a desperate plight that Eyre was compelled to abandon everything that was not obsolutely essential to life. Two of the natives deserted, but subsequently rejoined the party, murdered Baxter, and decamped, carrying most of the stores away with them. The condition in which Eyre found himself the next morning when day broke would have caused most men to despair. He was in a waterless desert 500 miles from the nearest settlement with an inadequate supply of provisions, and a black boy to assist him in guarding what remained from treacherous natives Inactivity would mean disaster, and as soon as Eyre had buried the body of his devoted follower he resumed his journey. The boy remained loyal, and on June 2 they reached Thistle Cove, where they found the French whaler Mississippi. The commander, Captain Rossiter, treated Eyre with the greatest kindness. At the end of a fortnight Eyre determined to complete his self-imposed task. He reached King George's Sound without further mishap.

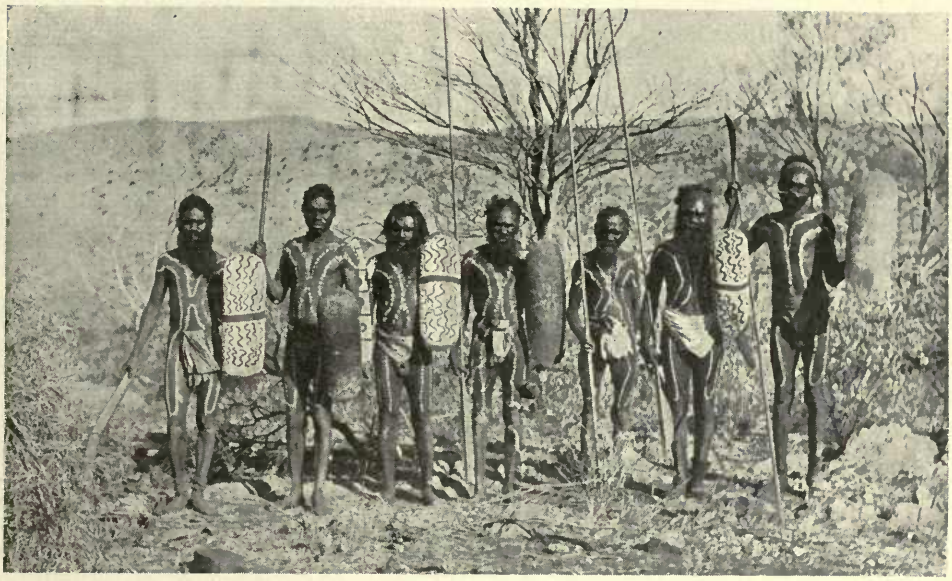
THROUGH THE HEART OF THE CONTINENT.

The immense belt of territory to which the term Central Australia is applied proved a hard nut for explorers to crack. The vastness of the country, the difficulties and dangers, served to fire the imagination of adventurous men. Many noble deeds were done far out of sight of the public—with no thought of reward. It would be impossible to describe the amount of suffering endured by those who freely gave their lives to the work of solving the problems presented by inland Australia.

On the sand-drifts—on the veldt side—in the fern scrub they lay,
That their sons may follow after by the bones along the way.

The first explorer who fell a victim to the hardships and dangers which beset the paths of the pioneer bushmen in Northern Australia was Ludwig Leichhardt, the Prussian scholar and scientist, whose fate has never been definitely ascertained. Leichhardt made his first trip into the interior from Brisbane to Port Essington in 1844-6. In October, 1847, he set out on his last journey with the object of travelling to the Barcoo River and thence via the head of the Gulf of Carpentaria to Swan River. A letter was subsequently received by his friends which he wrote at Canning Down on February 26, 1848. That was the last authentic news of the expedition, and, although it is supposed that the letter "L" which Gregory saw carved on a tree in lat. 24.25, long. 145.6, marked the site of one of his camps, the theory has never been verified. Leichhardt was followed by the Hon. A. C. Gregory, who is still living in Queensland. After having made several journeys into the interior of Western Australia he was commissioned in 1855, by the Royal Geographical Society of London, to search for the missing explorer, who had then been absent more than four years. The expedition was also fitted out for exploration purposes, and the late Dr. Von Mueller accompanied the party as botanist. The explorers were conveyed to the mouth of the Victoria River by sea, and Gregory succeeded in following that stream to the east of the Fritzroy Range before the end of the year. Portion of the party eventually travelled to Mount Wilson, after which they retraced their steps and crossed the watershed of the Victoria River, and thence via the Roper River to the mouth of the Albert. Finding that the vessel which was to have met him there had not arrived, Gregory continued his journey overland to Brisbane. That trip has been described by a competent authority as "one of the finest, most extensive, and expeditious explorations which has ever been recorded in Australia." In 1858 Gregory made another unsuccessful search for Leichhardt. It was during this trip that he found the tree marked by the ill-fated explorer.

About the time that Gregory completed his last journey into the interior the idea of crossing the continent from south to north began to exercise a fascinating influence upon the minds of those who were interested in Australian geographical problems. The desire to achieve that object was stimulated by an offer from the South



J. H. Harris photo. Central Australian Natives in their War Paint.

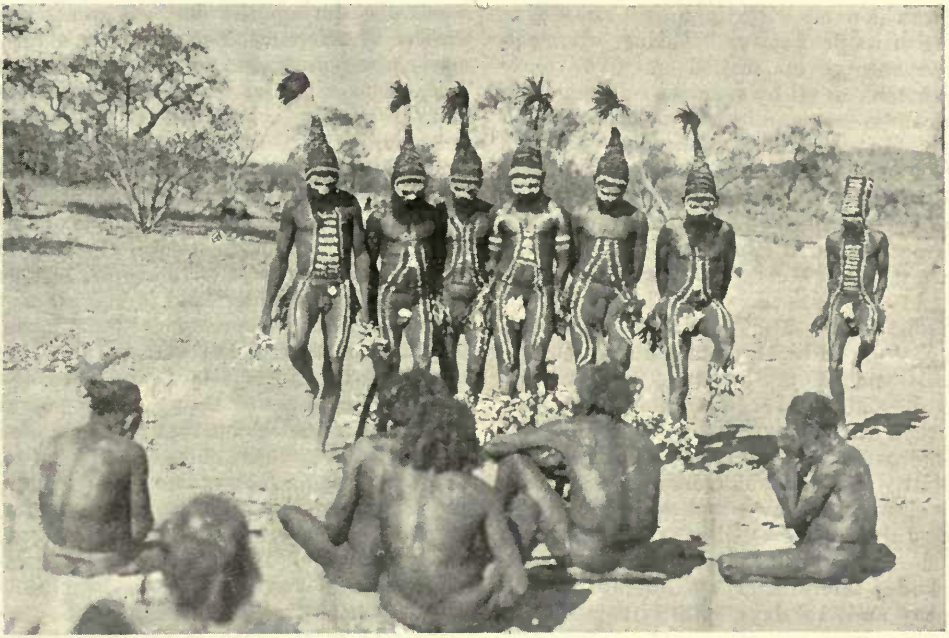
Australian Government of a bonus of £2,000 to the explorer who first succeeded in accomplishing the feat. John McDouall Stuart, representing South Australia, and Robert O'Hara Burke, the ill-fated leader of a Victorian expedition, started for the prize. Stuart was the first on the scene, and he had pushed his way to a point within 250 miles of the Gulf of Carpentaria before Burke's party crossed the continent; he was compelled to give up the attempt, however, and before he could fit out another expedition and return to the Northern Territory, Messrs. Burke and Wills had succeeded in passing his nearest approach to the goal. Those two courageous men were not destined to share the honor which Stuart enjoyed a few months later, of standing upon the northern shore of the continent. Burke and Wills proceeded down the Flinders River until they reached a point where the stream was affected by the rise and fall of the tide. They were provided with camels, imported from India for the purpose, whilst Stuart accomplished his journey on horseback. Burke had left the bulk of his stores under the care of four men at Cooper's Creek, and but for the fact that the custodians of the goods—acting in accordance with their leader's instructions—left the depot on the very day that the travel-worn and starving advance party returned to Cooper's Creek, the gallant fellows might have been spared to enjoy the reward of their enterprise. They had endured terrible hardships during the return trip. One of the party died of starvation and fatigue. When the three famishing survivors reached the camp they found it deserted and only a small quantity of food available. Knowing that the remainder of the party could not be far in advance, Wills urged his leader to follow in their tracks, but Burke determined to strike across country towards the nearest sheep station, which proved to be much further away than he expected. The three men were eventually compelled to return to Cooper's Creek, where Burke and Wills died from starvation. Their companion, King, managed to obtain a subsistence from friendly natives until he was rescued by a relief expedition. The bodies of Burke and Wills were eventually taken to Melbourne, where they were accorded a public funeral on January 21, 1863. It is a pathetic fact that their bodies were brought to Adelaide at the same time that Stuart returned from his successful journey from the Southern to the Indian Ocean. This accentuated the joy with which Stuart was welcomed.

From Ocean to Ocean.

Forty-one years have elapsed since John McDouall Stuart waded into the sea on the

shore of Van Diemen Gulf and bathed his hands and face in the cool waters of the Indian Ocean after having crossed the continent from south to north. It was the first time that such a feat had been accomplished, and it is not difficult to imagine the delight with which the tired and travel-stained little band gazed upon the ever-changing sea and listened to the music of its waves after their long and arduous ride through the heart of a great continent. The narrative of that great achievement which Stuart gave to the world after he reached Adelaide is one of the most thrilling stories of adventure ever penned. The heroic fortitude which he displayed during the return journey, when he was too weak and ill to sit in the saddle, has seldom been surpassed. On October 31, 1862, he wrote in his journal:—"I feel a little improvement this morning, which I hope will continue; and I think I have reached the turn of this terrible disease (scurvy). On Tuesday night (this extract was written on Friday) I certainly was in the grasp of death. A cold, clammy perspiration, with a tremulous motion, kept creeping slowly over my body during the night, and everything near me had the smell of decaying mortality in the last stage of decomposition and of the grave. I sincerely thank the Almighty Giver of all Good that He, in His infinite goodness and mercy, gave me strength and courage to overcome the grim and hoary-headed king of terrors, and has kindly permitted me yet to live a little longer in this world. . . . What a sad difference there is from what I was when the party left North Adelaide! My right hand nearly useless to me by accident, total blindness after sunset—although the moon shines bright to others, to me it is total darkness—and nearly blind during the day; my limbs so weak and painful that I am obliged to be carried about; my body reduced to that of infantine weakness —a sad, sad wreck of former days." In spite of bodily infirmity he continued to press forward.

The entry made in his diary on the following day reads:—"Although in such a weak state, I shall try if I can ride in the stretcher (carried between two horses) as far as Hamilton Springs. Started early; found the stretcher to answer very well. On arriving at the Springs saw that there was not sufficient water for the horses, and, as I had stood this part of the journey so well, made up my mind to cross the range to Brinkley Bluff. Arrived there about 5 p.m. I have stood the long journey better than I expected, but feel very tired and worn out." On another occasion he wrote:—"Started in the cool of the morning, and in two hours reached where the party were camped so much exhausted and so completely done up that I could not speak a word—the power of speech has completely left me. . . . Gave orders that a horse was to be shot at sundown, as we are getting rather short of meat. I hope the change of beef-tea made from fresh meat will give me some increase of strength, for I am now reduced to a perfect skeleton, a mere shadow. . . . Fresh meat to the party is now a great treat, but I am denied participating in that pleasure from the dreadful state in which my mouth still is. I can chew nothing, and all that I have been living on is a little beef tea and a little flour, which I am obliged to swallow." These extracts are typical of the entries in the explorer's diary for a period of three months, and they indicate the terrible suffering which Stuart and his brave men faced for many weary weeks. "Should anything happen to me I keep everything ready for the worst. My plan is finished and my journal brought up every night, so that no doubt whatever can be thrown upon what I have done. All the difficult country is now passed, and what remains is well known to those who have been out with me before; so that there is no danger of the party not finding their way back should I be taken away." At the time Stuart penned those words, eighteen years had passed since he gained his first experience as an explorer under the leadership of Captain Sturt. It was on Thursday, July 24, 1862, that Stuart made the following entry in his journal:—"Thring Creek, entering the marsh. . . At eight miles and a-half came upon a broad valley of black alluvial soil covered with long grass; from this I can hear the wash of the sea. . . . Crossed the valley and entered the scrub, which was a complete network of vines. Stopped the horses to clear a way, whilst I advanced a few yards on to the beach, and was gratified and delighted to behold the water of the Indian Ocean in Van Diemen Gulf



F. J. Gillen photo. *A Corroboree, Arunta Tribe, Central Australia.*

Central Australian Natives on the War path. The native on the extreme left tracked a white man, who had lost his way, for several hundred miles, and arrived in time to save his life.

J. H. Harris photo.

before the party with the horses knew anything of its proximity. Thring, who rode in advance of me, called out 'The sea!' which took us all by surprise. Then they gave three long and hearty cheers. . . . I dipped my feet and washed my face and hands in the sea, as I promised the late Governor, Sir Richard McDonnell, I would do if I reached it." The names of those who accompanied Stuart on that historic journey were Messrs. William Kekwick (second officer), F. W. Thring (third officer), W. P. Auld (assistant), Stephen King, John Billiatt, James Frew, Heath Nash, and John McGorrerey (shoeing smith). Mr. J. W. Waterhouse was also attached to the expedition as naturalist. Of the party, Messrs. Auld, Thring, King, Billiatt, Nash, and McGorrerey are alive. The return journey was begun on Saturday, July 26, from Charles Creek, near Chambers Bay, and the expedition reached Adelaide safely after an absence of 12 months and 13 days. Stuart was still suffering from the effects of the terrible attack of scurvy which had prostrated him in the interior, but the cordial welcome which he received from his fellow-colonists rewarded him in some degree for the hardships he had endured. Subsequently the South Australian Government gave him a more tangible expression of its appreciation. A resolution was carried in Parliament to the effect that £3,500 should be paid as a reward to John McDouall Stuart and the members of his party, of which sum the leader was to receive £2,000. The Royal Geographical Society of London awarded him its medal and a gold watch. His success as an explorer was phenomenal, and his five expeditions into the interior were carried out without the loss of human life. Stuart's journey across the continent enabled him to give valuable advice regarding the proposal to construct a telegraph line across the continent to Port Darwin, and the line closely followed his tracks. Stuart died in England in 1869.

A Gallant Band.

Since 1862 numerous explorers have been engaged in the task of determining the nature of the country on either side of the long but comparatively narrow strip of territory with which Stuart became familiar. The most important expeditions which have been equipped in South Australia during the last 40 years are worthy of reference, however, and a foremost place must be accorded to Ernest Giles, who acted as leader of several exploring parties. In 1872 Giles crossed fine country to the westward of the overland telegraph line, and soon after his return was appointed to command a party which mapped out about 700 miles of territory. In 1875 he was selected to command the expedition equipped by the late Sir Thomas Elder, and forced his way across hills and plains for 1,500 miles. During one stage of the journey no water was obtainable for 19 days, and even the camels suffered considerably. Giles was away for six months on that occasion, and travelled altogether about 2,400 miles. William Christie Gosse, who was for some time Surveyor-General of South Australia, entered the Government service in 1859, and was engaged in making trigonometrical surveys in the Far North. In 1873 he was sent out to explore new country about 800 miles south of Central Mount Stuart, with the ultimate object of pushing over to Western Australia. Gosse left Alice Springs in April, and discovered Ayers' Rock—which he named after the late Sir Henry Ayers. He failed to reach Western Australia, and returned to Alice Springs in December, 1873. He was successful, however, in obtaining an accurate geographical knowledge of 60,000 square miles of new country. Gosse died in 1881 before he was 40 years of age. Major Peter Egerton Warburton, formerly Commissioner of Police in Adelaide, conducted several expeditions into the interior between 1856 and 1874. In 1873 he started across the continent, and with the aid of camels he succeeded in reaching an outstation in Western Australia after nine months travel. During the latter part of the time the party subsisted mainly on the flesh of worn-out camels. He was rewarded for his enterprise by a grant of £1,000 from the South Australian Parliament, and was created a C.M.G. in 1875. He died in 1889.

Mr. David Lindsay. F.R.G.S., is a native of South Australia who has worthily maintained the traditions of Australian exploration. In 1883 he was selected to lead an expedition which was about to proceed to Arnheim Land; and afterwards conducted another party through the in-

terior. On the latter occasion he explored the country between the overland telegraph line and the Queensland border. He discovered a deposit of rubies in the McDonnell Ranges which at the time excited great interest; and a few years later was chosen as leader of the Elder Exploring Expedition, which was equipped for the purpose of scientifically examining the unmapped portions of Australia. Mr. Lindsay passed within 12 miles of the Coolgardie goldfields, and was the first to call attention to the existence of the large auriferous region in the Western State. Mr. L. A. Wells' explorations; Mr. Davidson's work in Central Australia during the years 1898 and 1901; the splendid labors of the late Mr. Winnecke; and Mr. R. T. Maurice's recent expedition through a large tract of country to the north of Fowler's Bay, are contemporary history, the details of which are familiar to all South Australians who take an interest in the development of the State and its northern dependency. Each of the gentlemen named have rendered valuable service by carefully examining territory which had not been previously surveyed. Mr. Maurice has made several extensive journeys along the western boundary of this State, and has done splendid work at his own expense.

No record of exploration in South Australia would be complete without a reference to Sir John Forrest, the present Federal Minister for Home Affairs. Although most of his exploration work was done in the adjoining State of Western Australia, his name is also intimately connected with South Australia. He was selected in 1869 to command the expedition sent out to search for Leichhardt, and in 1870 he commanded the party which travelled from Perth to Adelaide along the south coast, and proved the practicability of the route for the telegraph line between the two capitals. Four years later he crossed the country between Champion Bay, in Western Australia, to the overland telegraph line, a journey of 2,000 miles. A former Governor of Western Australia (Sir Frederick Weld) writing to Lord Carnarvon, said:—"Mr. Forrest's expedition has bridged the gap that separated Western Australia from the other colonies, has led to settlement on the shores of the Great Bight, and to the connection of this colony with the rest of the world by electric telegraph. I never doubted the future of Western Australia from the day when the news of Mr. Forrest's success reached Perth."

Not a year goes by—scarcely a day—without an addition to the map of some range of hills, lakes, a tract of country suitable for the raising of live stock or an auriferous belt where the prospector may with advantage follow up the success of the road-breaking legion. The roll call of South Australian explorers contains many honored names of men who nobly did their duty in making known the interior of the continent and letting light into "Darkest Australia." They were the pathfinders and bridge builders—the "road breakers" who made possible the peaceful occupation of the country for industrial development.

The Northern Territory.

There are two Australias. One lies within the tropics and the other is in the temperate zone. Nobody disputes that fact, because nobody who cares to look at the map can doubt it. Northern Australia is in the same latitudes as Mozambique, Samoa, Abyssinia, and Senegambia. It has been established—also beyond doubt—that the country is capable of producing on a commercial basis such products as sugar cane, rice, maize, linseed, varieties of oil plants, tea, coffee, indiarubber, tobacco, cotton, millet, and cocoanuts. Yet with a soil capable of raising such choice products, a rainfall that can be measured in feet, and no lack of sunshine, the Northern Territory continues to be a nightmare to Australian statesmen, and a geographical enigma to the rest of the world. White men who have lived and worked there are unanimous in declaring that only the colored races can develop the resources of tropical South Australia. Politicians who once thought otherwise, but visited the place with open minds to enquire on the spot, have come back and admitted that the white man cannot work in the fields. With that conviction strongly upon them they have returned south and voted for a "White Australia!" Senator Thomas Playford, now a member of the Federal Government, visited India and the Northern Territory early in the nineties as Premier of South Australia, to give effect to the following resolution passed by the South Australian Parliament: That "fifty experienced agricultural laborers and their families should be introduced under the Indian Immigration Act, that a special area of land should be set apart from them, and that subsist money should be provided until the land could maintain them. Mr. Playford, on his return (vide Parliamentary Paper 97, 1892), said: "The Territory must have cheap labor if tropical products are to be grown and sold with profit in the markets of the world. This is admitted by all who have any special knowledge of the subject. Only tropical products can be grown in the Territory. European labor is not cheap, therefore if Europeans could stand the climate, tropical products could not be produced at a profit by them. It is generally admitted that Europeans cannot stand field work in tropical countries, therefore, first on the ground that European labor is not cheap, and secondly on the ground that the laborers cannot stand the climate, it is not possible to employ Europeans at tropical agriculture." The same statements have been iterated and reiterated by competent authorities during the last thirty years. "Facilities to obtain suitable land; facilities to obtain suitable cheap labor; capital to take advantage of the first two conditions; intelligent management to use and not to squander the capital." "Given these four conditions," says Dr. Holtze, for many years Curator of the Botanic Gardens at Port Darwin, and now occupying a similar position in Adelaide, "and the Territory will surely become a prosperous field for plantation enterprise." Southern Australia has declared for a "White Australia," and until there is some modification of that policy Northern Australia must continue to remain an unoccupied paradise of vegetable vitality and tropical luxuriance. Australia has yet to realise its duty towards this great territory, comprising fertile plains and high table lands, carrying nutritive herbage plants and grasses. The country is very little improved since the Portuguese visited it in 1500 and the Dutch a hundred years later, or since Torres passed through the straits that bear his name in 1606. Cook sailed along the coast in the next century, and Flinders in 1801. Portuguese, Dutchmen, and Englishmen, and in later days Australians, have all been unanimous in their praise of the country's natural beauties, the brilliancy of the tropic flowers, the rapid fecundation of tropic fruits, the grandeur of the jungle, and the luxuriance of growth everywhere to be seen.

The late Duke of Manchester, after an

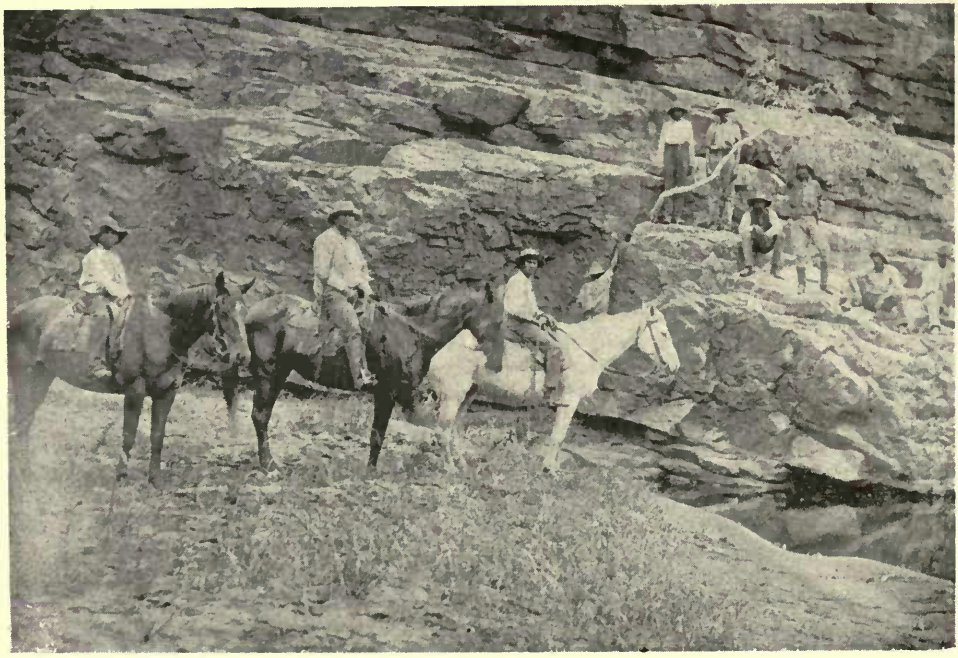
inspection lasting over several weeks in the Northern Territory, said: "I have seen other parts of Australia, and I must say before coming to Port Darwin I had certainly thought Queensland the finest part of Australia, but I now consider, as far as I can judge by that portion of the Northern Territory which I have seen, that the Territory is superior to Queensland, inasmuch as the vegetation seems richer, the grass thicker and of a more permanent character, and the country much better watered."

Sir Gordon Bremer took possession of Raffles Bay on behalf of the British Government, and for a time a military settlement was formed at Melville Island. In 1827 a military depot was established first at Raffles Bay and then at Port Essington. Leichhardt, the explorer visited the place in 1845, just before its desertion, and he was followed by Gregory and Stuart. It was the successful journey of the latter from south to north, and the additional knowledge supplied by his party of the resources of the country that induced South Australia to become foster mother to that portion of tropical Australia. Not only did John McDouall Stuart practically "discover" the Northern Territory, but his advocacy led to its annexation by South Australia. Prior to the expeditions of Leichhardt and Gregory, the great north-central part of Australia lying north of 126th parallel of S. latitude, and between the 129th and 138th meridians of east longitude, was technically attached to New South Wales. The boundaries of Queensland, South Australia, and Western Australia even to the disposal of "no man's land" had been agreed upon, but no mention had been made of the territory in between. One of the first proposals made was that it should be proclaimed as a new Crown colony, and subsequently that it should be divided between Queensland and South Australia. When Stuart crossed the continent and planted the Union Jack on the shores of the Arafura Sea, and returned through the heart of Australia to Adelaide, the South Australian Government of the day applied for the land in question. This request was acceded to by the British authorities, and in 1863 letters patent were granted incorporating the Northern Territory with South Australia. Since that time it has been managed from Adelaide, with a Government Resident located at Port Darwin.

The total area of the Northern Territory is 523,620 square miles, equal to 335,116,800 acres, or, say, 2½ times the size of France and 4½ times the size of Great Britain. It lies between the 129th and 138th degrees of east longitude, the southern boundary is the 126th parallel of south latitude, and the most northerly point of land nearly reaches the 11th parallel With the exception of about 2½ degrees, the country is within the tropics or torrid zone. This fact has had and is likely to have an important bearing in the future development of a resourceful country. Many authorities declare that the Northern Territory cannot be utilized without the aid of colored labor, but the policy of South Australia was in recent years prior to federation opposed to this, and now that the Commonwealth Parliament has confirmed the "White Australia" doctrine the employment of workmen in all parts of the continent is restricted to Europeans.

Of the great resources of the country under review there never could be any dispute. Attention has been directed in the chapter on the pastoral industry to the suitable character of the table land country of the Northern Territory for the raising of cattle and horses. It will be interesting here, however—when dealing specifically with this north country—to quote the opinion of authorities who have travelled through it. My own journeyings have taken me through the heart of the continent and out in the north-east towards the Queensland border and the Gulf of Carpentaria. I can confirm many of the statements made concerning the quality of land and the supply of water and good grasses. As in other parts of the world, soil and climate and natural conditions over such a vast area vary. There are all sorts of country and several kinds of climate. Port Darwin in the north has an average annual rainfall of over 60 inches; Charlotte Waters, the southern point of the Northern Territory, has about 6 in. The traveller between these two points and west and east finds stony wastes and spinifex, waterless plains and rocky, barren ranges alternating with undulating well-grassed downs, rich well-watered plains, heavily

View near Undoolya Cattle Station, Central Australia, the property of the Willowie Pastoral Company.



A Mustering Party, MacDonnell Ranges.

timbered hills, and on the north coast large navigable rivers.

Of the Victoria River country on the west Mr. Wilson, the geologist to Gregory's expedition, wrote: "In no part of the world have I seen grass grow so luxuriantly, and Mr. H. Gregory observed to me during a ten days' journey, when I accompanied him and his brother to the upper Victoria, that he had seen more grass land than during all his life before. An aggregate of 5,000,000 of acres came under the united observation of the party, and may all be considered well-watered pasture land." Many years after Mr. N. Buchanan reported: "I can confirm Gregory's accounts that the Victoria River country contains some of the finest pastoral lands in Australia. The grasses are principally Mitchell, Landsborough, or Flinders, and blue grasses, with some barley grass. The country is well watered back from the river and its tributaries, which are permanent." Of the Victoria River, Captain Carrington wrote: "Perhaps the value of this magnificent stream as a commercial highway may be better shown by comparison. In making the comparison I have only in view its capacity as a harbor and easiness of access. I have no hesitation whatever in saying that the Victoria is superior to the Thames, the Mersey, or Hooghly. The quantity of land for which the Victoria is the natural, and, I believe, only outlet is approximately 90,000 square miles, or, say, 57,000,000 acres." Of North-east Arnheim's Land Mr. H. Heber Percy, a Queensland squatter, reported: "I was surprised to find the land so good. It is destined sooner or later to be made use of for agriculture and to carry a large population." Of the eastern country, Mr. Isaac Little, a pastoral tenant, wrote: "I estimate that this part of the table land will carry from four to five millions of sheep. Of course, large sums for fencing and dam-making will have to be expended first." Mr. John Costello, of Lake Nash, in his evidence before the Royal Commission, said: "There is a large area of country from Newcastle Waters and the head of the Roper to the Queensland border at Camooweal. This magnificent belt of country known as the table land may be said to be the cream of the pastoral land of the Territory. I have the fullest and greatest faith in the future of squatting in it. I have travelled over most of the sheep-raising country in Queensland, and I can safely say that in no part of that colony have I seen country better adapted for wool-growing than this splendid table land. A permanent supply of water can be obtained in this country at a depth varying from 150 to 250 ft. It would not require an expensive boring plant to put down a 7-in. tubed well that depth. At each such well 6,000 to 8,000 head of cattle could be watered. It would be a certain reserve store in case of drought. I think I might safely say that (with sufficient wells) the stations from Lake Nash to the head of the MacArthur would be equal to supporting 10,000,000 sheep." Of Central Australia the late Mr. E. S. Flint, of Alice Springs, wrote: "Cattle and horses thrive well, especially the latter, which in dry seasons are able to travel farther from water to feed. I am of opinion that Central Australia will be the chief horse producing district of Australia. Its contiguity to the tropics renders horses more hardy, and better able to cope with the heat and other drawbacks attaching to a tropical country than animals bred further south." The area held under pastoral leases in 1902, the latest statistics available, was 176,000 square miles; the area declared stocked 91,144 miles. During 1902 14,000 cattle were exported, their value being £72,801. The Government Resident, in his report for 1902, stated: "On the whole I regard the outlook for the pastoral industry as being most promising, and that year by year we may look forward to its gradual expansion."

The latest returns show a wonderful increase in the number of stock: Cattle, 1900, 250,730; 1901, 255,521; 1902, 305,820. Horses, 1900, 11,640; 1901, 12,896; 1902, 14,788. Sheep, 1900, 54,210; 1901, 48,324; 1902, 42,122. The exports for the last three years were: Cattle, 1900, 8,490 head, value £39,277; 1901, 36,036, value £170,241; 1902, 14,348, value £72,801. Horses, 1900, 522, value £3,175; 1901, 1,039, value £7,551; 1902, 447, value £2,166. Wool, 1900, 100,007 lb., value £3,244; 1901, 257,722 lb., value £6,719; 1902, 178,154 lb., value £6,253. The Eastern and African Cold Storage Company has acquired a large tract of country—about 19,000 square miles on the

eastern side of the territory—and is now stocking this with cattle.

The late Hon. J. L. Parsons, for some years Government Resident of the Northern Territory, and the best friend that country has ever had, was a strong believer in its agricultural resources. He regarded agriculture as "the richest resource of all." Dr. Maurice W. Holtze, F.L.S., F.R.G.S. (Lond.), for some time Curator of the Botanic Gardens, Palmerston, is equally convinced that tropical South Australia offers a promising field for the agriculturist. In a paper read before the Royal Geographical Society, Adelaide, Dr. Holtze said: "Now, I am not a company promoter, and must, therefore, caution you not to expect glowing descriptions of land capable of growing everything, everywhere, and without exertion, a land where you scrape the ground, throw down a few tobacco seeds, and then after some time come and pick the best Manilla cigars ready made from the bushes. No! The Northern Territory has no such capabilities. On the contrary, a large part of the country is utterly unfit for cultivation, and it has been its curse that inexpert persons have tried to establish plantations on unsuitable land, and then explained their failures by asserting that the country is unfit for cultivation. That is not the case. There is quite enough suitable land for very considerable cultivation, quite sufficient to make the country prosperous. But proper selection must be made very carefully by a man understanding the properties of the soil in the dry season and in the wet. The manager must know his business, not only from books or from a casual run through a plantation, perhaps quite different in soil and rainfall from the place he intends to cultivate. Then with sufficient means and suitable labor plantations in the Northern Territory will succeed, but not before. Here, now, before going further, I must say that in my opinion the agricultural land in the Northern Territory is situated near the sea coast and on the banks of the rivers flowing to the sea. Not that there is no good land inland, but the lack of sufficient rain will, in most cases, militate against successful tropical agriculture. We must, therefore, take it as granted that plantations should be kept within a belt of, say, 80 miles wide round the coast. This would give us an area of about 80,000 square miles. A small part of the Northern Territory, indeed, but yet, even granted that less than one-quarter of this area is suitable for agriculture, it is sufficiently large to employ a number equal to all the inhabitants of South Australia in tropical agriculture. This assertion may seem greatly exaggerated till you remember that Java, within less than five days' steam from Port Darwin, carries on something like 80,000 square miles a population of considerably over twenty millions. . . . I have before this strongly and repeatedly recommended that the Territory should be encouraged in every way to grow rice, but since I have seen Saigon (Cochin China) and its rice country I am more than ever convinced that only cheap labor and liberal land laws are required to make the Northern Territory the great rice field for the Australian colonies."

The following is taken from the last annual report (1902) of the Curator of Botanic Gardens at Port Darwin:

RICE.—The plot reserved for rice was cropped last season with the usual very satisfactory results, and is now again under crop. This cereal is destined to become, I am convinced, one of great importance to the Northern Territory in the future. Three varieties of rice are indigenous to the Northern Territory, and we have a great area of land eminently suited for such cultivation. Such land being low-lying, is inundated every wet season, and this fact, considered by many people as a detriment, is, on the contrary, the condition demanded by the swamp variety of rice, which is the most prolific and profitable. Droughts are unknown, and, however light may be the rainfall, these low-lying lands are each season sufficiently inundated for rice culture. Insect enemies or pests have been conspicuous by their absence during all the years that rice has been grown here. The plot reserved in the garden for rice-growing has been now continuously cropped with that cereal for the past sixteen years without the least manure, and from first to last the results have been uniformly successful, proving how suitable the soil and situation is for the rice plant. The soil is heavy clay, under water in the growing season and is typical of what is to be met on our river banks. Analysis made by the Government Analyst of samples of soil from the Daly

The Boomerang, Stuart's Creek Station, Central Australia.

Scene North of Wigley, Central Australia.

and Adelaide Rivers, and from the rice plot in the garden show how nearly identical they are in all essential constituents.

Starch Plants.—Two contiguous plots are occupied with the Tous le mois and the Bermuda arrowroot, which are pictures of luxuriant growth. Another plot is planted with the Cassava plant, which does very well here, but I regret to say is not altogether exempt from the attacks of white ants, despite the poisonous nature of its tuber in the raw state. It may be of interest to remark that the South Sea Island arrowroot (Tacca Pinnatifida) is a native of this place, and, for its value, is represented by a few plants in the garden. I have seen wonderful growth made by this plant in its indigenous condition on the islands in Bynoe Harbor, distant about thirty miles.

Fibre Plants.—Our collection is a very complete one in this respect, and the most conspicuous species is the Sisal hemp, which is now flowering, and which has certainly found a congenial home here. The Grass-cloth (Rhea), African bowstring, and Mauritius hemps are all represented in separate plots, and clearly show their adaptability to soil and climate. While on this topic I cannot refrain from again alluding to the number of prominent fibre plants which are native to the Territory. The jute plant (Corchorus capsularis), which is the most largely cultivated of any fibre plant in India, and of which fibre in its raw state Great Britain imports over four million pounds sterling in value annually, grows naturally within seven miles of Palmerston. Another prominent Indian fibre plant, Sunn hemp (Crotolaria juncea), was found by me on the Daly River, while yet another Indian fibre plant, the Deccan hemp (Hibiscus cannabinus) is common enough in most parts of the Territory.

Oil Plants.—Peanut, tilseed, jatropha, African oil palm, ben oil, candle nut, are all represented in quantity in the garden, and have been proved thoroughly suited to soil and climate, while castor oil exists as a weed in the waste parts of the garden.

In addition to the plants noticed above, a large variety of other plants of economic value is being cultivated in the garden, and every effort is made to enrich our collection whenever possible."

Of the mineral wealth of the Northern Territory the Rev. T. E. Tenison Woods, F.G.S., the famous geologist, after much exploration work and years of experience, said: "I confidently assert that the Northern Territory is exceptionally rich in minerals, only a small portion of which has been made known to the public. I do not believe that the same quantity of mineral, veins of gold, silver, tin, copper, and lead will be found in any equal portion of Australia. In fact, I doubt if many provinces will be found in any country so singularly and exceptionally favored as Arnheim's Land in respect to mineral riches. Of the mines that have already been worked in gold especially, they cannot be said to have gone to any great depth, but nearly all have shown unusually good ore, and it is unquestionable that not 25 per cent. of the veins visible have been worked at all. Years will not exhaust the discoveries to be made here; when the difficulties of labor have been got over, as they will be surely ere long. The peninsula of Arnheim's Land will become one of the great mining centres of Australia."

Professor Tate, F.G.S., declared: "The development of the mineral resources of the Northern Territory is but in its infancy, and I believe that rich stanniferous lodes will yet be found. Rich auriferous lodes abound over a large tract of country. It is my honest conviction the gold reefs can be worked profitably and to a considerable depth." Mr. H. Y. L. Brown, F.G.S., Government Geologist in South Australia, in his evidence before the Commission, said: "The present gold mining fields are capable of much further development. They should go in for deep mining. They are only working on the surface now. There is a good deal of country for prospecting in the neighborhood of the existing goldfields. At the mouth of the Fitzmaurice I saw likely country for gold. The rocks at the mouth are auriferous. A good proportion of the best mining country is still open." He refers also to the Alligator River, Blue Mud Bay, Cape Arnheim, and the Nicholson River as worth prospecting. Of Tennant's Creek he said: "The rock formations there are essentially those in which gold may be expected to occur, and are well worth prospecting. At Barrow's Creek the rock formation and what I heard of the

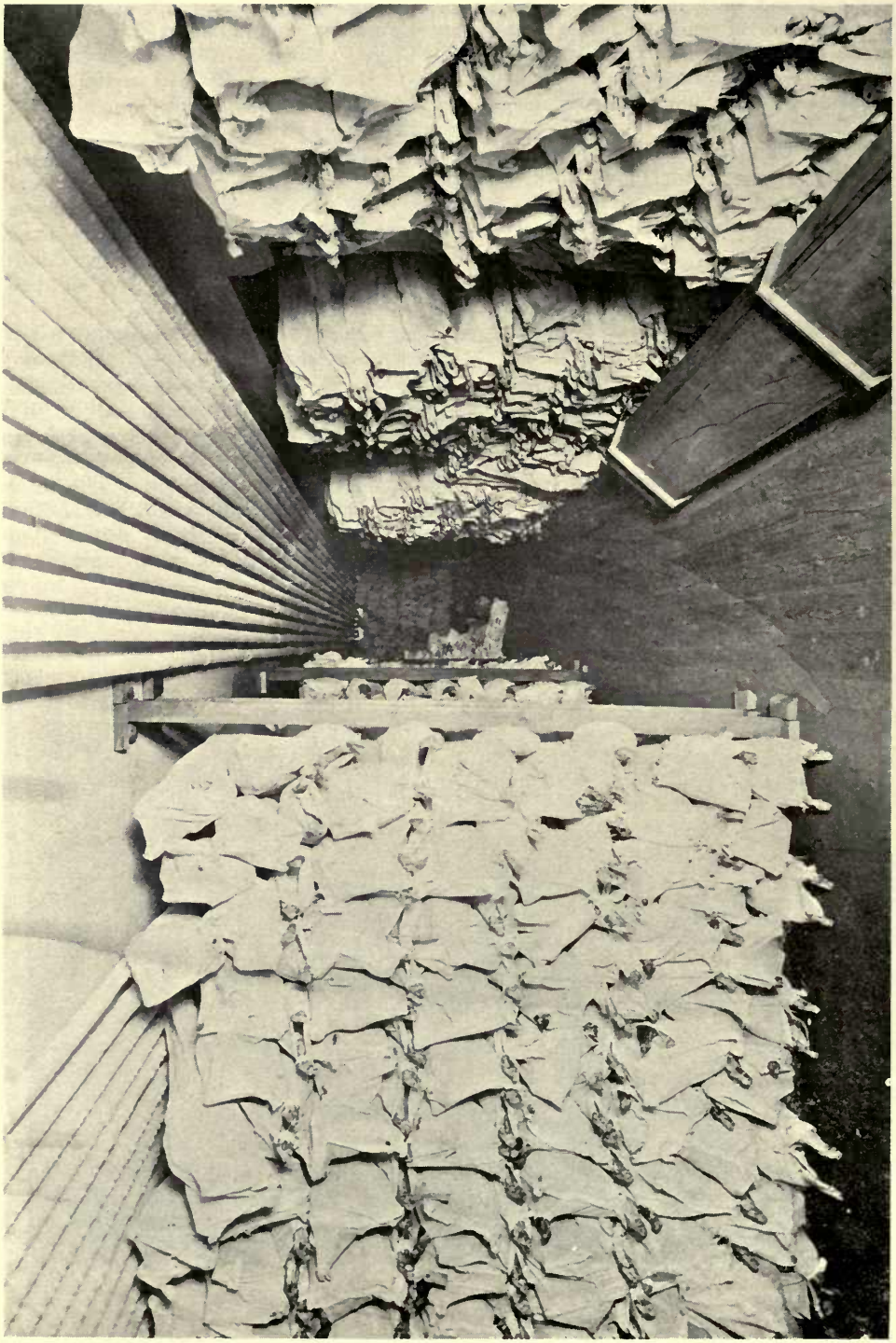
country east and west are most favorable to the occurrence of gold and other metallic minerals. The Bynoe Harbor tin mines showed tin lying on the surface, but had never been tried at a depth." Now one of these is being successfully worked by a Port Darwin Company. Mr. Brown also reports favorably on other goldfields, tin and copper areas. On the Victoria River and Fossil Head, where carboniferous fossils were discovered by him, and at the MacArthur River, where shale beds exist, he states that coal seams probably exist. Mr. J. V. Parkes, late Inspector of Mines, in his full and detailed report, says: "I have no hesitation in saying that the Northern Territory is phenomenally rich in minerals, but more especially in gold and tin."

The total area held under mineral lease on December 31, 1902, was 1,949 acres. One hundred and twenty-four mineral licences, representing 9,880 acres, were issued during the year. The area held under lease for gold was 4,093 acres, representing an annual rental of £2,046. The total quantity of gold exported in 1902 was 20,967 oz., valued at £70,251, as against gold to the value of £76,579 in 1901. Tin to the value of £5,985 and copper £1,813 were exported in 1902.

A profitable industry is that of pearl-fishing. The whole northern coast from Cape York to North-West Cape—a stretch of coast of about 2,000 miles—is the natural habitat of the pearl oyster. Pearl-shell to the value of £20,497 was shipped in 1902.

The population of the Northern Territory aggregates 3,884, made up as follows: Europeans, 680 males and 200 females (880); Japanese, 330 and 40 (370); Chinese, 2,300 and 140 (2,440); Malays, 122 and 22 (144); others, 45 and 5 (50); 3,477 males and 407 females. The total value of imports in 1902 was £107,217, and exports £191,558. Gold represented £70,000, cattle £72,000, and mother of pearlshell £20,000.

A Prospector's Camp, MacDonnell Ranges.



One of the Cold Storage Chambers, Government Freezing Works, Port Adelaide. *(See page 78.)*

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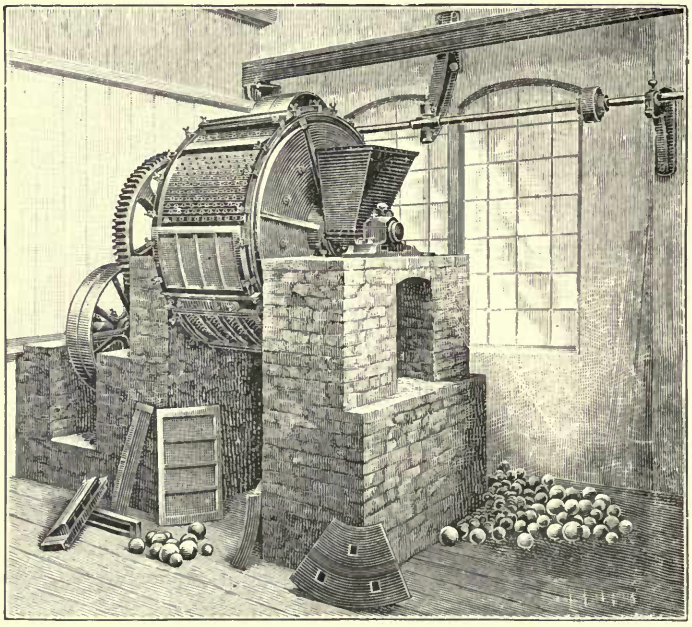

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Reserve Liability of Shareholders, £600,000.

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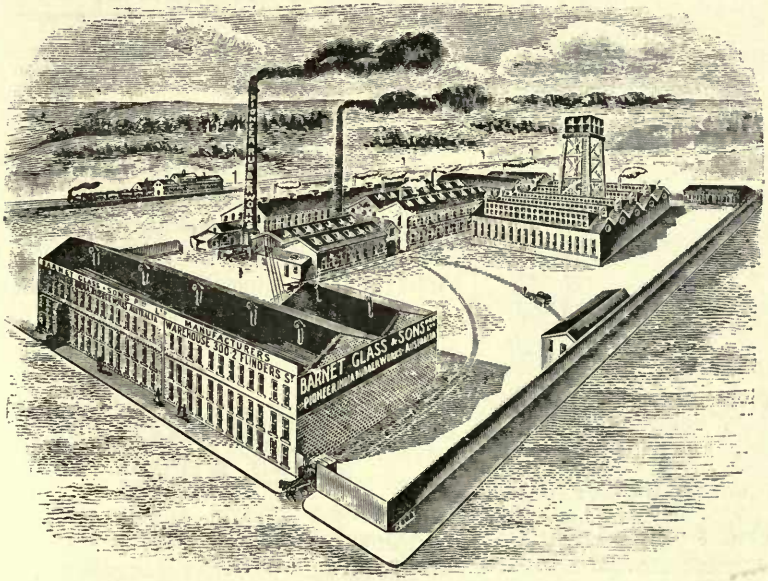

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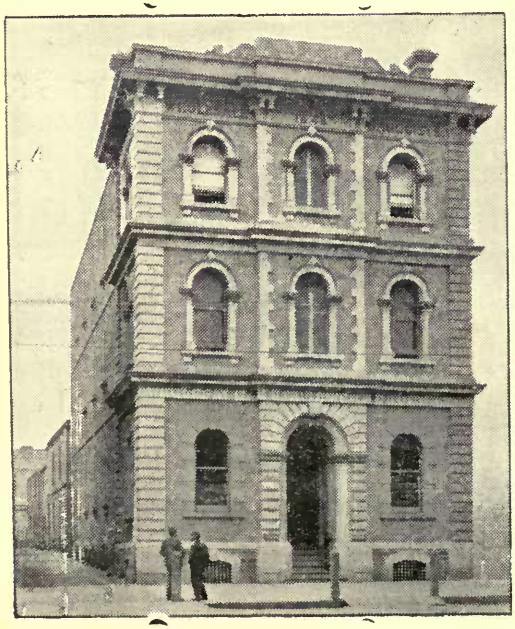

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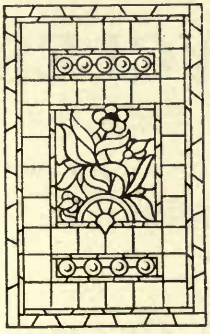

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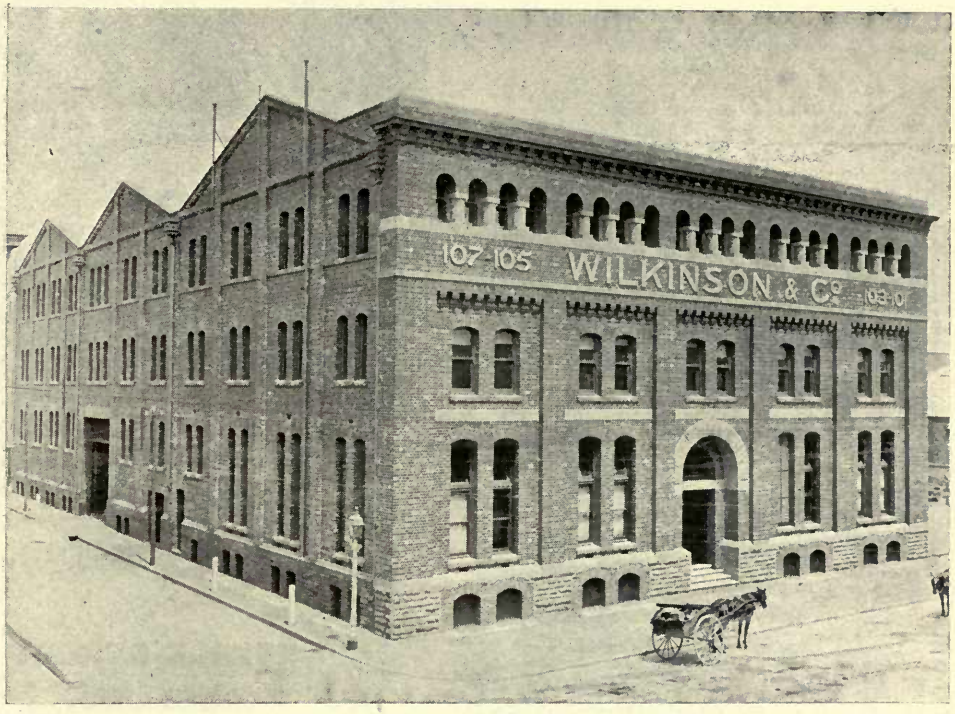

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Ceylon is by no means the only market from which GRIFFITHS BROS. get their teas. China and India furnish their quota, tea from the latter place having been practically introduced to Australia by this firm. No one tea is universally popular, a blend of Chinese and Indian tea commanding a better sale than the unmixed tea from either country. Besides tea, the firm deals largely with coffees and cocoas at its warehouse in Rundle Street. As a last word on the tea question, I may tell you that the tea plant may be induced to grow without any difficulty in Victoria and the Mount Lofty hills. It is doing well in Mr. Griffiths' garden at Bayswater, and it makes an exceedingly pretty ornamental shrub. Economic conditions are against it being grown for commercial purposes, as the land can probably be turned to greater profit by other means. At the same time, it is an interesting item to add to your garden, the flower as well as the oliage having much to recommend it.

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This brings us back to the starting-point, and we are now standing on the threshold of the "temple of trade" with the manager (Mr. E. Masey). No fewer than 160 machines, ranging in value from £210 to £5, were seen in action, turning out beautiful work, such as would have made the name of the olden-time operatives familiar in every boot factory in the State. "Machines are brainless" it is true, but they are faultless, and this is a great consideration, as the general public demand uniformity in style and finish. Two machines demand special notice "Lightning Lasters" they are called, and their name does not give wrong impressions. A machinist "feeds" a boot upper into tiny jaws, and in less time than it takes to write half a dozen words the job of "lasting" the boot is finished.

The Federal Boot Company produces its leather at the Hindmarsh tannery, Mr. P. H. Tunbridge being the manager. The chief retail trading house of the firm is at 78, Rundle-street, but an extensive wholesale warehouse is situated in Gawler-place, and 42 retail branches are scattered in various parts of the State. The success which is attending the efforts of the proprietor is well deserved, and the present indications are that the business will continue to expand in a greater ratio than ever.

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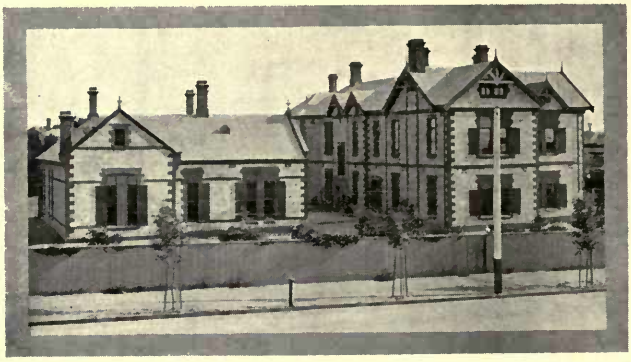

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The school is beautifully situated, and has large gardens and recreation grounds, cricket ground, and tennis court.

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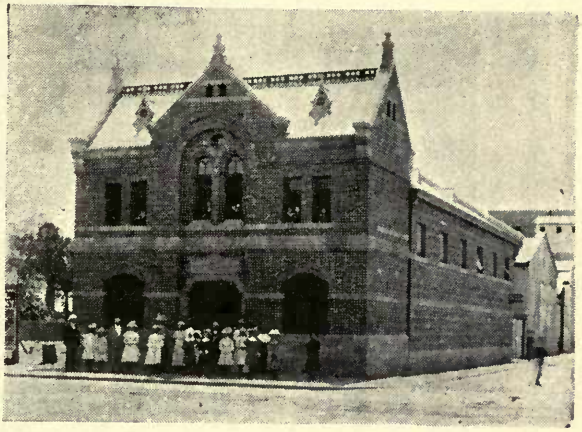

THE Main Hall of the Gymnasium is 70 ft. x 33 ft., and is fitted with all the necessary appliances for a course of systematical training. A spacious Lavatory and Swimming Bath adjoin the main hall. Dressingrooms, containing nearly 200 lockers, are placed at the members' disposal.

Gymnastics are valuable to all persons, but especially to clerks, students, sedentary artisans, and still more particularly to those who, in addition to sedentary habits, perform exhaustive intellectual labour. With the latter class, suffering from INDIGESTION and nervous debility, nothing but a wise system of gymnastic training can prevent the early failure of the powers of life.

Sandow quotes in "Physical Culture," March, 1899: "Although all games, sports, &c., carried on in the open air, if indulged in in moderation, tend to make boys healthy, active, and manly, they DO NOT and CANNOT compensate for the wants of an intelligent and progressive system of Physical Culture. For instance, of what use are either cricket or football to a weakly boy with an inclination, perhaps, to be knock-kneed, round-backed, or flat-footed? None at all. And if he is either forced or jeered into playing games he is much more likely to grow worse than better."

As to the frequency of the exercises, Dr. Ideler says:—"For the student, one or (better) two lessons in vigorous exercises each week will be sufficient. EVERY ORGAN WHEN BROUGHT TO ITS FULL TENSION HAS A TENDENCY TO CONTINUE UNIMPAIRED FOR A LONG TIME."

The sedentary life is one full of pitfalls. Such is now the strain of mental competition that the body is too often neglected. This neglect brings with it physical degeneration, and physical degeneration as surely undermines the mental and moral strength.

Still, however, it must be admitted that under the present day conditions of life there is only one form of exercise which can be practised by all, from the weakest to the strongest, and from the poorest to the richest, from the most occupied to the most leisured classes. I refer to systematic exercise, which can be followed day in and day out, in the smallest room or in the open air.

Systematic exercise has these several advantages over general or recreative exercises: its practice occupies comparatively little time; each movement has a definite object, the result of which can be accurately calculated; by its means one secures general and well-balanced development, almost an impossibility in ordinary exercise, the tendency of which is to develop one part of the body at the expense of another; the will power is strengthened; the internal organs, including the heart and the lungs, share in the benefits obtained. The contraction of the muscle is regulated by a series of nervous stimulations to the obvious muscle cells, the strength of such stimulus being tensified by the use of will power; in fact it is impossible to exaggerate the importance of will power in systematic exercise.

The function of exercise is then to give to the body in any age and in either sex, the health, the strength, the beauty and grace which nature originally intended it should have, but of which it has been deprived by the shackled condition of civilised life The object of systematic exercise is to bring this great possibility within the reach of all, so that in the shortest space of time, whatever the physical condition may be, whatever the weight of the individual's purse may be, these results can be obtained without undue demands upon the time of the pupil, and without the slightest fear of overtaxing his strength.

In exertion it is the chest which fails a man, either from loss of wind or from failure of the heart, and this is also the case with the torso, which cannot, in the average individual, stand any muscular strain. The cramped positions in which men do their work, the long hours, the inducements to forego exercise—indeed, the lack of time to devote to exercise—the follies of dress and the false supports have made the modern torso the hideous undeveloped thing it is. In nearly all cases of deformity it is the spine, shoulder-blade, shoulder-joint, hip or ribs that are at fault. The muscles are weak and the body falls into false positions, which, through persistence, produce the various deformities. This is a condition which can easily be remedied with a little care and attention. There is no reason why the possession of a perfect frame should be denied to any one on earth.

Auldana Vineyards.

ULDANA VINEYARDS, situated a few miles out of Adelaide, are noted for the quality of the wines produced there, and each year the proprietors are compelled to increase the area under vines on account of the great demand for their wines.

ST. HENRI CLARET is renowned for its light alcoholic strength, and is greatly recommended by the medical profession. This wine secured a Silver Medal at Bordeaux Exhibition, also the Simpson Twenty Guinea Cup, the most valuable trophy offered in the State for competition amongst vignerons. This Cup had to be won twice before becoming the property of the exhibitor. AULDANA CHABLIS secured it the first year it was offered, and as the year following ST. HENRI CLARET was awarded first prize, the Cup became the property of the Auldana Proprietors. The winning of such a valuable Cup in two successive years speaks for itself.

AULDANA secured two Champion Cups, presented by the Royal Agricultural Society of South Australia, also the same number at the Agricultural Show at Sydney. AULDANA ST. HENRI CLARET and SPECIAL HOCK are the only Australian Wines used on the French Mail Steamers trading to the Commonwealth. Their SPECIAL PORT is noted for its high quality, and is used at the Adelaide Hospital for medicinal purposes.

A noted wine produced at Auldana is their SHERRY, which experts pronounce equal to the imported wine of that brand.

The Vineyards are reached by car after a beautiful ride through the Eastern Suburbs, and visitors are there welcomed by the managing partner, Mons. E. Mazure, who is looked upon as an authority on all matters pertaining to the making of wine.

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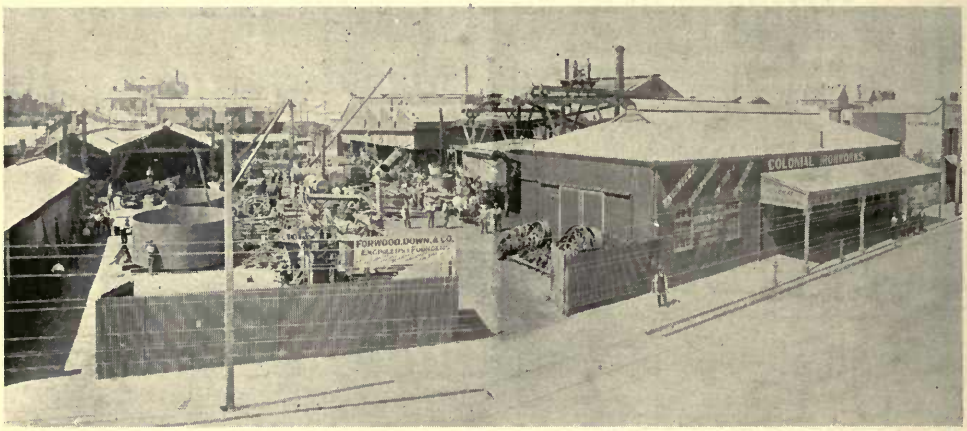

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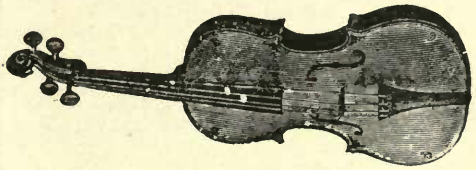

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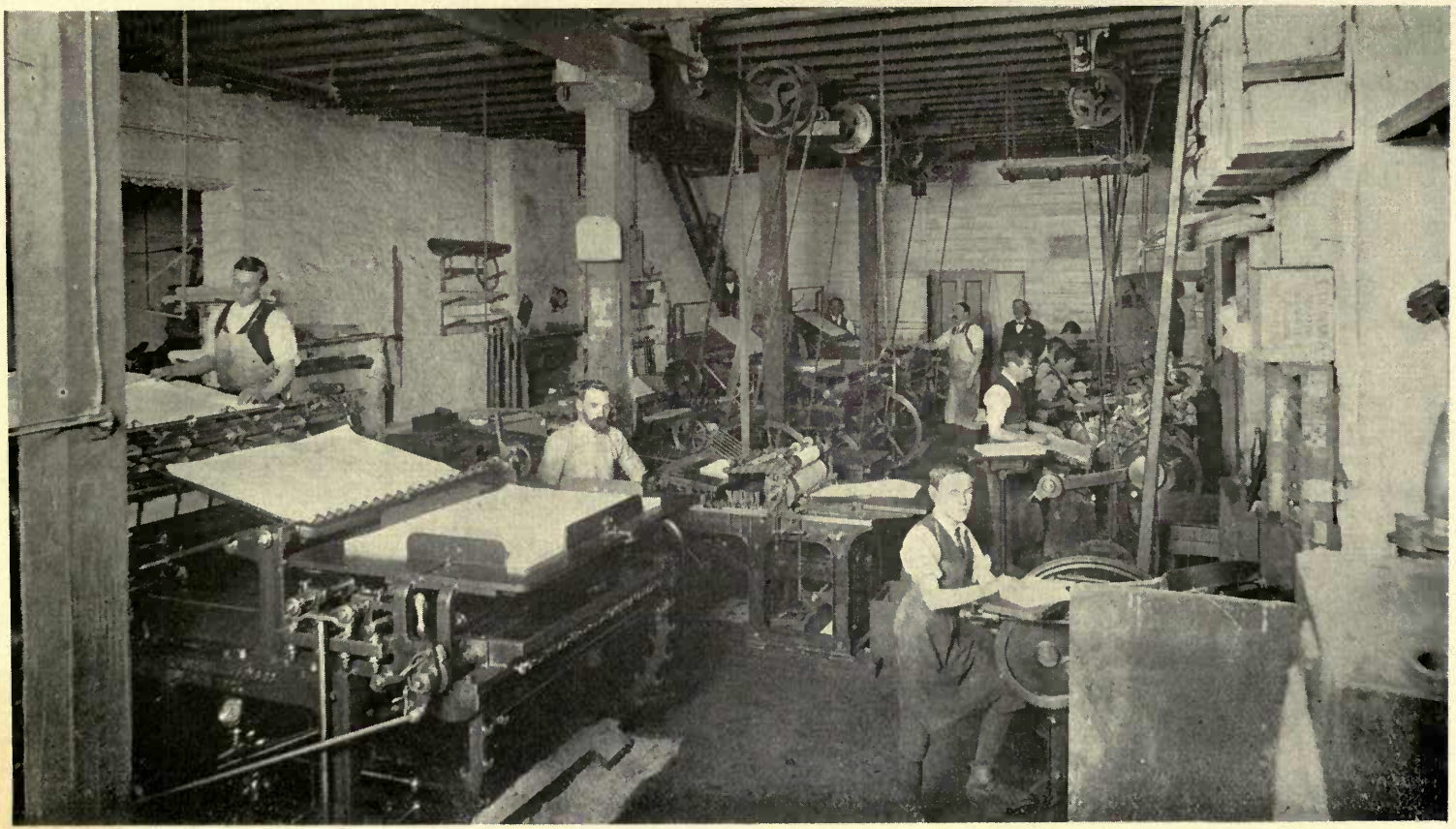

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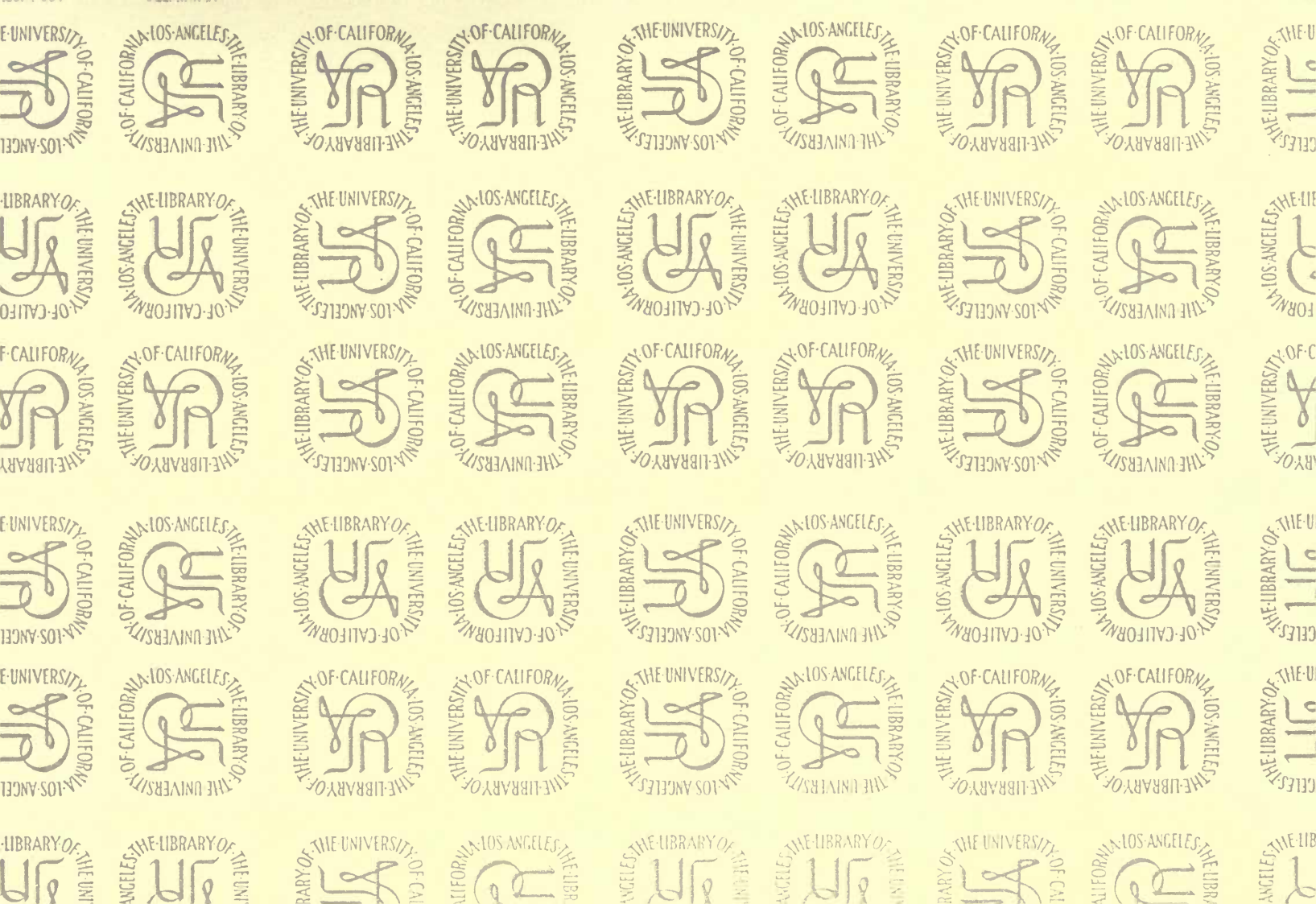
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